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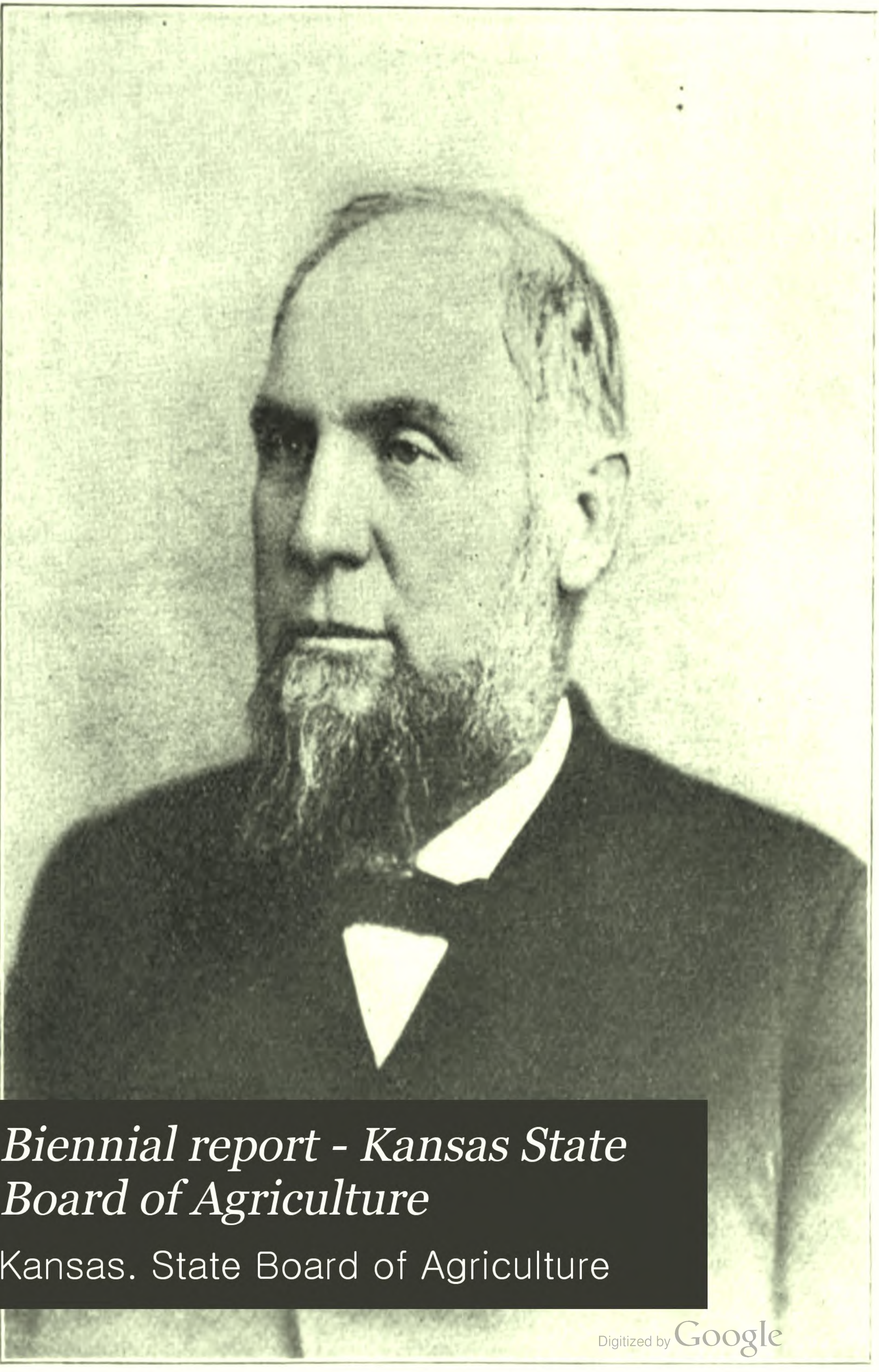

Biennial report - Kansas State Board of Agriculture

Kansas. State Board of Agriculture

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COMPLIMENTS OF THE
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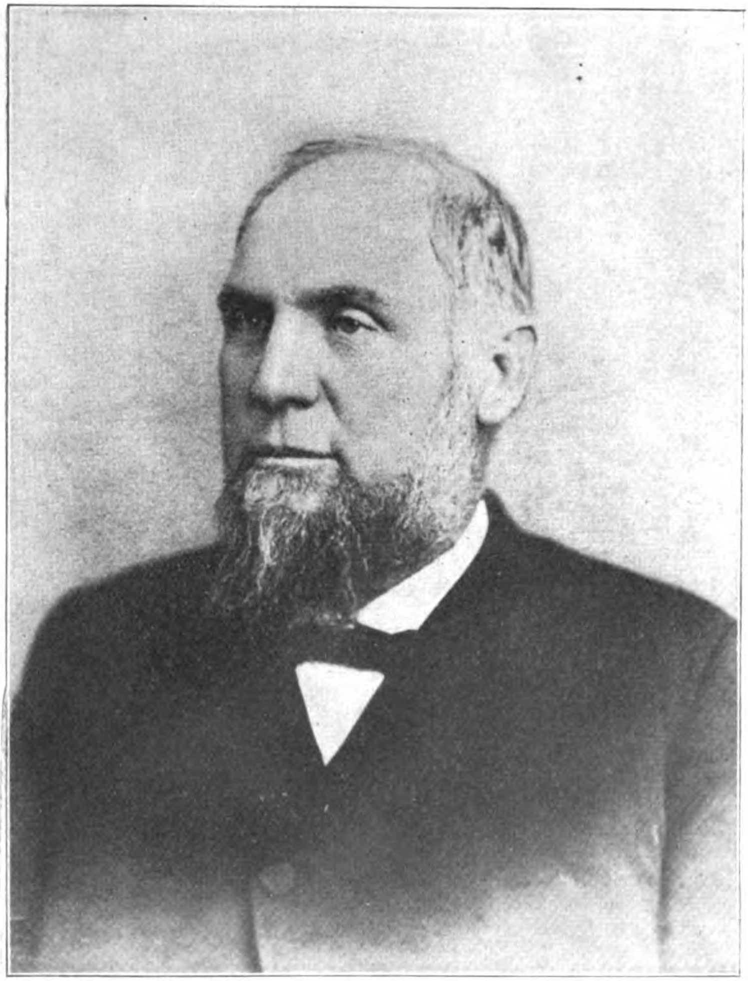

GEORGE W. GLICK.

Vice president State Board of Agriculture 1876-'77; member 1883-'84, and member or president for 22 years, from 1889 to 1911. Born in Greencastle, Ohio, July 4, 1827. Died April 13, 1911.

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EIGHTEENTH BIENNIAL REPORT

OF THE

KANSAS STATE BOARD OF AGRICULTURE

TO THE LEGISLATURE OF THE STATE,
FOR THE YEARS 1911 AND 1912.

DEVOTED TO INFORMATION REGARDING THE FARMING, SOILS AND CROPS OF
KANSAS; MACHINERY BEST CALCULATED FOR DEALING WITH THESE;
IRRIGATION BY WATER PUMPED FROM WELLS; COMBATING ORCHARD
AND GARDEN PESTS; ANIMAL HUSBANDRY, DAIRYING AND THE
FARM POULTRY INDUSTRY; THE BETTERMENT OF THE
HOME, AND IMPROVEMENT OF THE COUNTRY'S
YOUTH, INCLUDING 264 ILLUSTRATIONS
AND DIAGRAMS.

ALSO

THE STATE'S AGRICULTURAL STATISTICS

FOR THE BIENNIAL PERIOD, AND THOSE FOR THE PRECEDING TWENTY YEARS.

TOGETHER WITH TABLES, STATEMENTS AND SUMMARIES, SHOWING
THE POPULATION, PRODUCTS, PROGRESS, ASSESSED VALUA-
TION, RAILROAD MILEAGE AND GENERAL
DEVELOPMENT OF THE STATE.

TOPEKA:
KANSAS DEPARTMENT OF AGRICULTURE,
1913.
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KANSAS STATE BOARD OF AGRICULTURE.

1912.

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Chas. H. **Sessions**, Secretary of State, } *Ex officio*, Topeka.

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OFFICE OF THE STATE BOARD OF AGRICULTURE,
TOPEKA, KAN., January 1, 1913.

To his Excellency W. R. Stubbs, Governor of Kansas:

We have the honor to transmit herewith the Eighteenth Biennial Report of the Kansas State Board of Agriculture, for the years 1911 and 1912.

Very respectfully,

I. L. DIESEM, *President.*
F. D. COBURN, *Secretary.*

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PART II.—Animal Husbandry.

PART III.—Farm Poultry.

PART IV.—Educational Problems of Rural Life.

PART V.—General Statistics 1911 and 1912.

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INTRODUCTORY.

OFFICE OF THE STATE BOARD OF AGRICULTURE,
TOPEKA, KAN., January 1, 1913.

To the Legislature of Kansas:

The State Board of Agriculture respectfully submits this volume as its Eighteenth Biennial Report, for the years 1911 and 1912.

It is presented in the belief that our farmers, as well as citizens engaged in other lines of endeavor, may find the book of interest and value in their affairs. As a casual examination will show, the report is devoted largely to information calculated to be of practical helpfulness to the man who tills the soil and cares for live stock, while the back pages are, as in its predecessors, given over to the population, agricultural and live-stock statistics, in general for the state, and also in detail by counties.

Figures are popularly considered dry forage, but when they faithfully record the growth, development and prosperity of our state's foremost industry—agriculture, they are fed upon with relish by the citizens of Kansas who are proud of her achievements and glory in her resources. These statistics show both our strength and our weakness, agriculturally. They tabulate our wide range of crops and immense aggregate productions, and at the same time reveal our shortcomings as measured by acre-yields. Much of the text of this publication is directed toward remedying the latter by emphasizing the importance of better farming. This implies, of course, not only intelligent cultivation, but rotation, including the legumes, diversity of products, live-stock husbandry and dairying. In diversity lies comparative safety, for should a season be unfavorable for one variety of crop another may yield abundantly.

In the working out of the agricultural problems of Kansas the sorghums and alfalfa were brought into requisition, and after preliminary trials at the experiment station and by progressive farmers here and there, have generally been adopted

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as plants of much promise under our conditions. They have proven even more valuable to the farming industry of Kansas than the most sanguine in the early '90's had anticipated, not the least of their merits being reliability in production, even though the season be too short of timely moisture to properly mature other forage. Their growing provides the best available insurance against the dry seasons, to which every agricultural region is subject, and when conditions favor big yields of other products alfalfa and the sorghums are found to respond with equally generous increases.

These two plants have steadily grown in appreciation since their widespread introduction as field crops, and the year 1912 finds them of a greater importance than at any previous time in the history of the state. Their value, as forage, aggregated more than twenty-nine million dollars, or 36 per cent more than in 1911. The increase in Kafir planting in 1912 was remarkable, amounting to 503,068 acres, or 54 per cent, making the total 1,422,114 acres. The acreage had never before reached the million mark. It is an interesting fact, and one that should carry a moral to our farmers, that with the recollections of a dry season fresh in their minds, they invariably plant more of the sorghums the next year. This is sufficient evidence that these crops are recognized as dry-weather resistants and reliable producers, but the lesson that should be taught by these experiences is that Kafir, milo and the saccharine varieties should be extensively grown every season, and hence the greatest benefit derived, for then their products would be assuredly available when most needed. As it is, too often the precaution to plant is taken after the damage from lack of winter feed has been done, something on the order of "locking the barn door after the horse has been stolen." In other words, the increased acreages of sorghums may be planted following a dry season, when their forage, although always appreciated, is not so urgently needed. The farmers of Kansas have found their faith in the sorghums as dry-weather crops well justified, in addition to the other virtues of these grain and forage plants. In 1911, a year of unseasonal rainfall, the gain in their acreage was more than 47 per cent, and in 1912 there was an additional increase amounting to 27 per cent.

It is an agreeable fact, too, that in the same period the state's alfalfa area, for the first time, reached a million acres,

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or to be exact, 1,000,785 acres. This is nearly a fourth of the alfalfa growing in the United States, according to the government's census returns.

Another noteworthy development is the growth of the dairy industry, indicated by the increase in the value of dairy products, amounting to three-quarters of a million dollars in 1912, and a gain in two years in the number of milch cows of 244,498, or 38 per cent. Other collateral evidence of the tendency toward cow culture may be found in the extensive building of silos throughout the state. Not only are these prized for the succulent rations they make possible in winter, and quite naturally would come into more general use on that account alone, the dry weather of 1911 and the long winter following doubtless had a still greater influence in bringing the silo sharply to the favorable attention of many who had previously regarded it with more or less indifference.

In passing it may be said that the Board's plan, from the beginning, of calculating or basing the crop valuations on prices that represented the average value of each for the entire current year, and comprehending the whole state, instead of basing the valuation on a price in some one market on some one of the year's 365 days, has been criticised by individuals here and there, but no one has proposed anything that experience has proven superior. Criticism has also been made of giving a valuation say, for the corn crop, and then for animals slaughtered or sold for slaughter, without deducting from the value given the animals the worth of the corn they had eaten, which of course contributed immeasurably to the great total. As these statistics have uniformly been presented in this way, each item showing absolutely for itself, the reader can readily view them separately if he wishes, and no one need be misled by seeing them added in the total. On the other hand, it may be said to those disposed to hold contrary views that the duplications shown by aggregating the items mentioned might be in large measure offset by products consumed and realized on but not appraised in these statistics, as, for example, the immense value of the grass and other forage crops used for pasture and soiling, that are such important factors in meat and milk-making everywhere.

Fault is occasionally found, too, with the statistics of yields; one critic, perhaps from a district where the season's conditions have not been favorable, claiming the figures are too

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high, and that prices are depressed thereby; while another, living in a locality where the season has been propitious and yields more than ordinarily heavy, asserts that the showings are too low and as a consequence land values in his section, as well as in the state generally, are unjustly depreciated.

Such critics apparently ignore the fact that the figures as to both yields and values, instead of being invented in the office of the Board of Agriculture, are the consensus of reports sent in by a corps of representative, reputable men in each county, who grow and sell the various products, and who are in every instance instructed and urged with all emphasis to *"be sure to make only safe, conservative estimates, and be fair to all interests, as we want these Kansas statistics to be absolutely dependable."* The Board stands by the assumption that an average of what is said by its 1600 to 2200 experienced, time-tested reporters, so instructed, and representing virtually every neighborhood in the state, is entitled to rather more credence than are the assertions of an individual who speaks of Kansas as a whole from observations in his own neighborhood, distorted too, possibly, by an unfortunate condition of his own personal affairs. The Board does not base its reports on what any one man sees, has heard, or says, nor does it accept any man, however wise, as the repository of all wisdom upon any subject with which its statistics deal.

The secretary is well aware that these statistics are not perfect. No such statistics are perfect; they are at best but approximations, and never entirely satisfactory even to their compiler, but he defends them against all comers until someone with more than mere theory or a censorious spirit presents out of actual experience in such work a plan better than the one now used; a plan, by the way, not devised by the present secretary, but wrought by and inherited from a line of distinguished predecessors.

The Board has been fortunate in having for its office helpers Assistant Secretary J. C. Mohler, Chief Clerk Frank E. McFarland, Ivor E. Davis and H. W. Doyle, and acknowledgment of their faithful industry and efficiency is hereby recorded.

F. D. COBURN, *Secretary.*

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A MODEL DAIRY BARN, WITH SILO.

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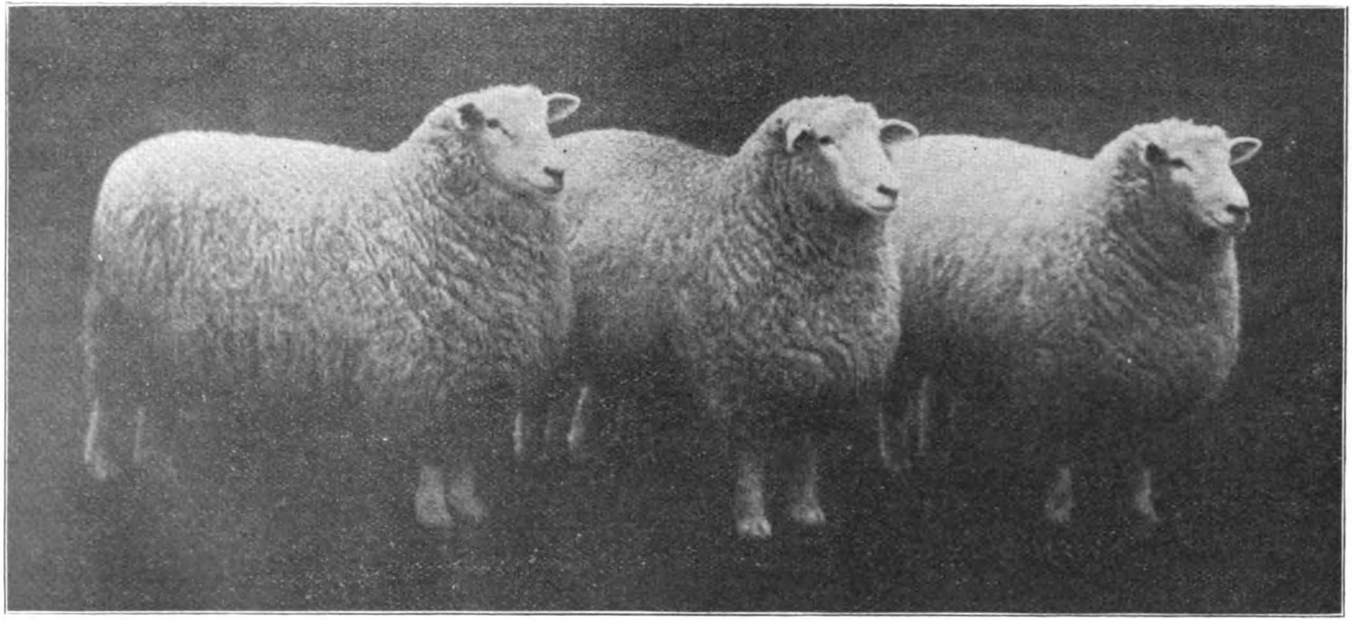

A GROUP OF ROMNEY MARSH SHEEP.

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Part I.

The Farm.

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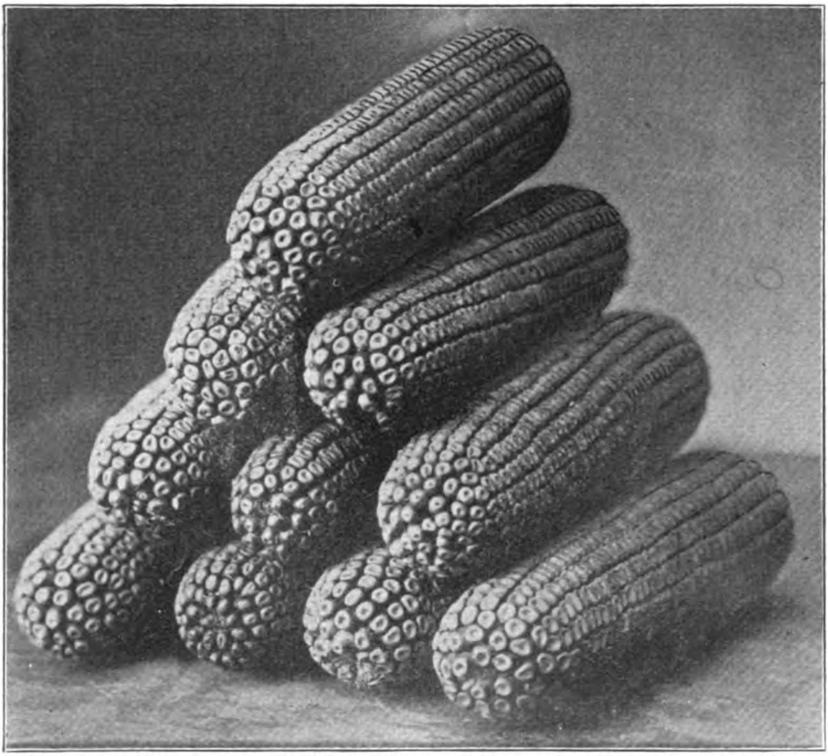

Corn that is pretty nearly ideal. Note how tips and butts are covered with grain.

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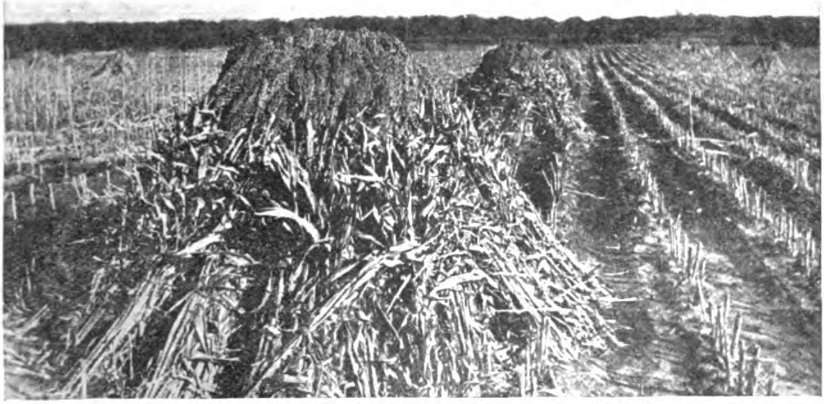
DEALING WITH THE FARM.

KAFIR CORN AND A KAFIR CARNIVAL.

By **Charles W. Wright**, Wichita, Kan., in the *Northwestern Miller*, Minneapolis, Minn.

Of recent years it has been quite the custom for every town in the agricultural sections of the country which entertains the smallest degree of civic pride to celebrate the harvest by conducting a festival or carnival of some nature. The county fair continues to be an event of importance, but this occasion seems not fully to satisfy the popular desire for the relaxation and gay frivolity that is provided by a carnival, with its traveling amusement troupe and home-talent street pageant, its brightly lighted streets and dingy hamburger stands.



Forty bushels of Kafir corn per acre where Indian corn was a total failure.

It has remained for El Dorado, county seat of Butler county, Kansas, to carry to a successful conclusion a carnival providing ample entertainment, educational features of an unusually high order, and at the same time to accord official, public and deserved recognition to a heretofore neglected cereal—Kafir corn.

Properly to set forth the reasons that caused El Dorado to hold a carnival for the express purpose of paying homage to Kafir corn it is necessary to relate briefly something of the earlier history of Butler county.

The largest county in Kansas, Butler contains 1428 square miles. It is east of the center of the state and in the second tier of counties from the Oklahoma line. It is located in part in what are known as the Flint Hills, and, much of its surface being rough, it is in no sense a wheat-growing county, but provides grazing for thousands of cattle shipped in each year from points farther west and south.

As the county became more settled, its farmers tried to grow corn, the cattlemen furnishing a ready market for this crop near at home. In 1877 they harvested 50,811 acres, the gross returns on which were about $8 per acre. Kafir corn was unknown to them at this time.

Twenty years later the farmers of Butler county planted 187,873 acres of corn, but in the meantime they had learned something about Kafir. They had planted 11,714 acres that year, and it had brought gross returns of $9.75 per acre.

Lincoln log cabin float at Kafir-corn carnival.

But corn is one of our most important crops. So fixed was the habit of growing, thirteen years later, in 1910, Butler county farmers had abandoned only one-third of the acreage devoted to the corn crop and replaced it with Kafir corn.

They had seen some slim years during that time, too. While the wheat farmers in the flat counties of their state had prospered, trying to grow corn or oats on the uplands of Butler county was unremunerative. In 1910 Butler county farmers planted 139,924 acres to corn; it brought them $6.60 per acre. They also raised 58,789 acres of Kafir corn; it returned $13 per acre. If the corn land had been planted to Kafir they would have been richer by some three-quarters of a million dollars—a very dignified sum with which to pay off mortgages, build new homes, send the children to college, or buy motor cars.

The farmers did some figuring during the long winter evenings that followed; the bankers became more insistent, and the corn-growing habit became less fixed and immovable.

In 1911 the Kafir-corn area was increased to 97,457 acres. The yield was from 20 to 60 bushels per acre. Thirty bushels to the acre might not be too high an average, and the price paid the farmer was

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about 50 cents per bushel. This is not bad for the uplands, and with nearly 32,000 acres of alfalfa in the fertile little valleys along the numerous streams traversing Butler county, things picked up materially and were looking rather bright in the fall.

The poorest, most gravelly hill in the county will grow Kafir, and cost the buyer probably $25 per acre. The better land sells for $70 to $100 per acre and even higher. And the bankers of El Dorado continue to urge the planting of Kafir.

Prize-winning Kafir-corn heads.

One of the objections frequently made to raising Kafir corn is that "it is hard on the land." In Butler county they will tell you this is not true, and add that just the reverse is the case, provided one knows how to grow the crop. They can take you to fields where Kafir has been grown for fifteen years without appreciable reduction in the yield or injury to the soil.

On this land, however, the Kafir is headed high and the stalks plowed under in the fall or early winter, the decaying vegetation being sufficiently nourishing to the soil to offset the loss of plant food occasioned by the succeeding crop. If the land can not be plowed in the autumn, it is disked so that it will retain the moisture that falls and be loosened by freezing and thawing.

Considerable Kafir is fed to live stock on the farms where it is raised. In such cases the soil is enriched by the manure, this being particularly true where alfalfa is fed with the Kafir.

There is a marked tendency in Butler county to plant only the Black-hulled White Kafir corn and to keep this strain from becoming mixed with the White-hulled or Red Kafir, milo maize and sorghum. One township makes a specialty of growing the Red variety of Kafir and a few students of Kafir culture are experimenting with cross-breeding of Kafir

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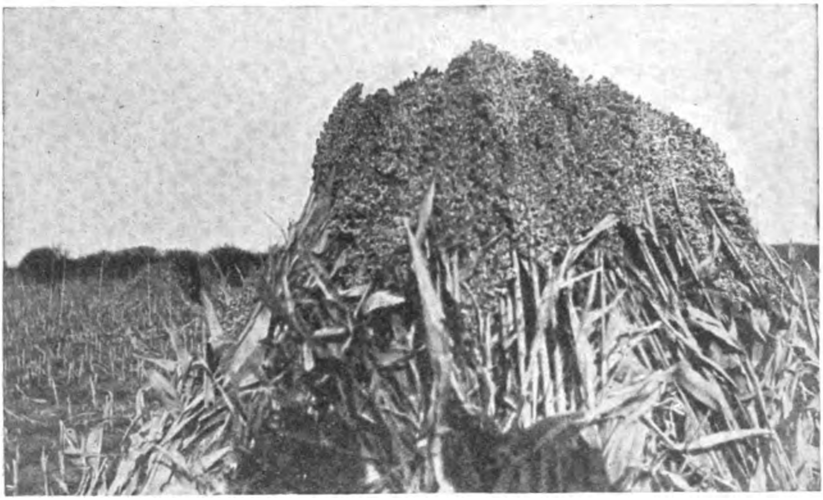
with milo maize or Jerusalem corn, but most farmers will pin their faith to the Black-hulled White variety until it is proven conclusively that there is something better. Milo maize yields more heavily, ordinarily, than Kafir, showing larger heads and kernels, but some say it is subject to too many of the ills that affect corn, particularly to injury by insects. The weight of the heads causes many of the stalks to bend, making it more difficult to harvest the "goosenecks" than the straight heads of Kafir.



Kafir corn in the shock.

The foregoing reasons fail, perhaps, to account fully for the preference shown to Black-hulled White Kafir; but the fact remains that an abundance of the best quality of seed Kafir obtainable anywhere is always available in Butler county, while in other Kansas counties, in Oklahoma and the Panhandle of Texas the planting of inferior seed is frequently shown in the quality and quantity of the yields. No crop responds more readily to good seed and proper cultivation than Kafir, yet it is the rule, rather than the exception, in much of the Southwest, to plant whatever seed happens to be convenient, to delay until a guess can be made on the outcome of the corn crop, and to neglect cultivation of Kafir if there is anything else to be done on the farm. Despite this condition and the tendency to choose the poorest soil for Kafir, it is pretty sure, in the dry-farming country, or on the uplands, to produce three times the yield of corn and with a third of the attention.

Along late in the summer, when Butler county was reasonably assured of a harvest approaching 3,000,000 bushels of this substitute for corn, somebody in El Dorado suggested that a public expression of the county's appreciation of what Kafir had accomplished for its people would be appropriate. The Butler county Kafir-corn carnival was the result.

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J. B. Adams, a banker and early advocate of the substitution of Kafir for Indian corn, was made chairman of the executive committee chosen to take charge of the work. The other members of the committee were W. F. Benson, also a banker; M. L. Arnold, county clerk; J. C. Powell, hardware merchant; H. L. Haines, dry-goods merchant; and Lee Scott, grocer.

A three days' celebration was planned for October 18, 19 and 20. The committee decided to erect booths on the opposite sides of one of the principal streets, and invite each township in the county to decorate one of these booths, using only the national colors and Kafir stalks, heads or kernels, in the work. Liberal prizes were offered for the best-decorated booths, for the best floats, exhibits of Kafir, milo maize, corn, oats and other grain and products grown in the county. Prizes were also offered for the best exhibits of cookery in which Kafir meal or flour were used, it being a matter of common knowledge locally that an excellent substitute for wheat flour, buckwheat flour or corn meal could be made from Kafir, for use in certain kinds of cooking.

Two products of Butler county, Kansas.

Invitations were extended to each of the twenty-nine townships of Butler county to participate in the celebration and to compete for the prizes offered. Twenty-five of these townships responded, and each selected a committee whose sole duty was to originate and carry into effect a decorative scheme that would cause all other townships to feel sorry their enthusiasm induced them to enter the contest.

The citizens of El Dorado were busy, too. Hundreds of loads of Kafir stalks, heads or grains were utilized to form every conceivable scheme of decoration. It was as though the entire Kafir crop of Butler county had been assembled at the county seat. Store windows displayed clothing and Kafir; hardware and Kafir; millinery and Kafir; groceries and Kafir—always Kafir. The verandas and walks of the homes were even fenced in Kafir stalks; heads of Kafir hung suspended in the windows after the manner of Christmas bells or holly wreaths.

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The street parade, about two miles in length, showed some exceptionally fine examples of the possibilities of Kafir corn as a decorative material for floats, many of which would have attracted favorable attention, because of their beauty and originality, in any large city where the services of expert decorators were available.

About 2000 school children, representing each school in the county, took part in the parade, those of each school having their particular "Kafir yell." The float of the El Dorado high school presented a replica of the school building, done by the pupils in "pebble-dash," only Kafir kernels were substituted for the pebbles. A local newspaper engendered pangs of jealousy among rival exhibitors by showing on its float a Kafir hut sufficiently guarded by a real native Kafir boy, fresh from Rhodesia and armed with a nervous-looking collection of spears and other weapons possessing unpronounceable names.

Lincoln township, besides decorating the booth that took first prize, exhibited a reproduction of Lincoln's log cabin, all of Kafir corn, except for the flintlock rifle, powderhorn, gourd dipper and coon-skin, which were nailed to the walls of the cabin. The queen of the carnival, herself a charming native of Butler county, ruled over a regal empire that was truly and materially Kafir, down to the most minute detail.

Thinking men attended the Butler county Kafir-corn carnival. The governor of the state, numerous senators and congressmen, prominent educators and agricultural experts mingled with the farmers, the cattlemen, the representatives of the large live-stock and grain markets of the West; and they discussed Kafir in its every phase. Some who came out of curiosity remained to study the underlying meaning of this unusual exhibition. They realized that it was more than a mere period of festivity. It was that—and more. It suggested a message that might be carried into every community in the western states where soil or climatic conditions made uncertain the growing of Indian corn.

This message may best be presented, perhaps, by quoting from an editorial by John Fields, which appeared in a recent number of the Oklahoma *Farm Journal.* Mr. Fields is a recognized authority on agricultural subjects, particularly those affecting the large southwestern territory, where the rainfall is insufficient, or poorly distributed, and where irrigation is not practicable. Mr. Fields said:

"It seems to me that there's something of a lesson for Oklahoma farmers and townspeople in what Kafir corn has done for all of the people of Butler county. Corn was n't very good up there last year, and so they nearly doubled their Kafir corn acreage in the spring of 1911. Corn was n't very good in Oklahoma last year, but last spring we proceeded to increase our corn acreage three per cent. We thought we 'd hit it right by planting a lot of corn, and very few of you planted much of an acreage of Kafir corn last April and May, when you ought to have planted it, and gave it decent cultivation, such as was given the corn. But after the corn died, and as a last resort, perhaps a third of the corn acreage was planted to Kafir corn, in July, when it had the poorest of chances to get a start. And yet, over much of the state this July-planted Kafir corn has matured a profitable crop and produced an abundance of feed for the stock after there seemed to be no chance left. This certainly indicates that the *Journal* has been right in insisting, for lo these many years, that at least ten acres of Kafir corn should be planted on every Oklahoma farm every year. And I hope that we will learn in Oklahoma,

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before disaster comes, that it is more profitable to grow the stuff and to get the money for building homes on Oklahoma farms than it is to try to farm to suit the whims of the fellows to whom we hope to sell out."

The farmer in the upland sections of the rain belt, or out in the dry-farming country of the Southwest, is coming to know what Kafir is good for. Though he may not feed it in the most intelligent manner possible, he knows that if he was forehanded enough to have raised a few acres of this crop his horses, cattle, hogs and poultry will not suffer for feed during the winter months. It is both grain and hay, if necessity demands. He knows too, that, if need be, he can insinuate a moderate portion of ground Kafir into the family bill of fare, and it would be no hardship.

But there is coming to be a widespread demand for Kafir throughout the entire country. In recognition of this condition the Wichita Board of Trade recently established a call market in which transactions in Kafir corn for future delivery may be made. Inquiries regarding the yield, prices and methods of trading in this grain are being received from a great variety of industries in widely scattered sections of the United States, and even quotations of Kafir for export shipment to foreign countries have been received.

To enumerate all the different uses to which Kafir corn is now put is rather beyond the ability of the writer, as new uses are constantly being discovered. By far the largest part of the surplus that finds its way to the general markets is utilized in the manufacture of stock and poultry foods. Its use in poultry foods extends back over a score of years, perhaps. In parts of Oklahoma, Texas, Colorado and other western states Kafir chop is as staple an article of feed-stuff for general purposes as corn chop, bran or shorts. There are several large plants in these states where a well-balanced feed is made by mixing ground Kafir heads, unthrashed, with alfalfa meal.

Flour mills, located where Kafir is available and their supply of white shorts unequal to the demand, find it profitable, as well as satisfactory to their trade, to mix a quantity of Kafir meal with their shorts. Mills using Kafir in this manner need to be careful to conform to the branding and tagging requirements of the various feeding-stuffs laws, as there are instances where neglect of this important detail has been productive of expense and undesirable notoriety.

Conversations with stockmen who are familiar with feeding Kafir bring out the information that the best way to feed this grain is in a cracked or ground form. Where hogs are fed in the same yards with cattle, it is all right to feed Kafir in the stalk or heads. As to the tendency of the grain to cause scouring, they say its effect is rather the reverse. As to feeding the fodder of Kafir, a stockman is authority for the statement that the time of cutting seems to have much bearing on its palatability, when fed to cattle, although he had never been able to discover the reason, or, one year with another, the best time to cut the fodder. The fact remained, he said, that sometimes cattle would eat the head, leaves and nearly the entire stalk, while at other times they would indifferently nose the fodder over, and eat but little of it. To judge from such actual experience in feeding Kafir in the stalk, it would seem that there remains much to be learned on the subject.

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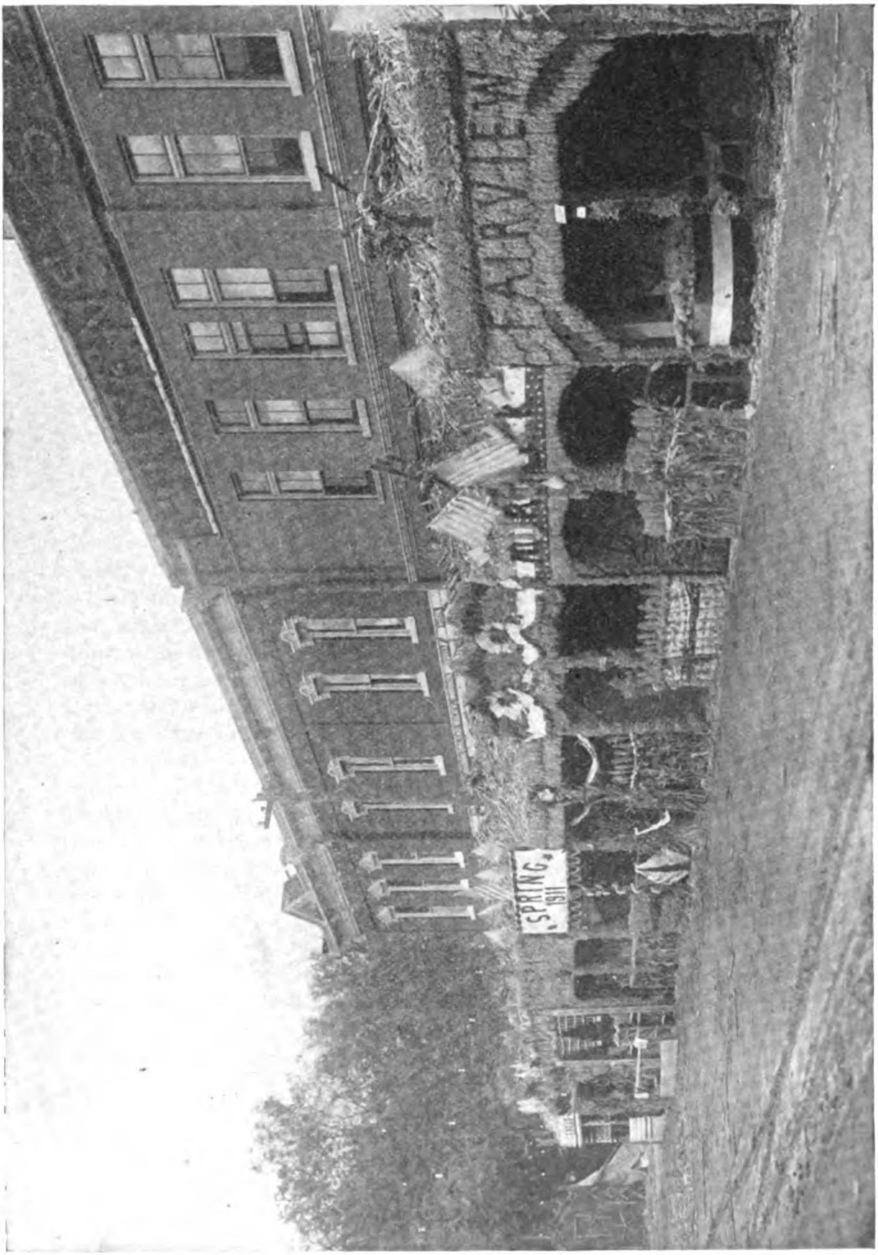

Kafir pike, Butler county Kafir-corn carnival.

Starch factories are taking much interest in Kafir corn of late. Kafir contains only fractionally less starch than Indian corn—a percentage entirely out of proportion to the difference in the cost of the two grains. Distilleries, too, are experimenting with Kafir in the production of alcohol. It is claimed that a greater amount of alcohol can be taken from the same weight of Kafir corn than from Indian corn. The heart or germ of the Kafir kernel is so small that the entire grain can be utilized in the distilling process. A considerable quantity of Kafir corn has been shipped this season to the large distillery centers, presumably for use in the manufacture of alcohol, although authentic information as to the purpose for which it is used seems to be lacking.

To arrive at a reasonably accurate estimate of the quantity of Kafir corn this season in excess of home requirements is difficult. The important surplus that can be moved eastward is grown in some twenty counties, extending westward from Butler county, and lying close to the Kansas-Oklahoma line, in both states. There have been estimates on the total production of Kafir in Nebraska, Kansas, Oklahoma, Colorado and Texas for 1911 that are as high as 50,000,000 bushels. This is probably too high, but, if correct, does not throw much light on the amount of the surplus Kafir that will be shipped to outside markets. Nebraska raises comparatively little Kafir. Texas and Colorado will consume their crops at home. In Kansas and Oklahoma, except for the few counties mentioned in the foregoing, the same statement will apply.

Again, few farmers grow a large acreage of Kafir, while many grow a small acreage and need it all for consumption on the farm. There are no "bonanza" farms where Kafir is grown on a large scale, and the crop from a thousand broad acres, totaling many carloads of grain, placed on the market in one lot.

Uncertainty exists, not alone as to the amount of Kafir grown in 1911 that may reach the outside markets, but also as to the extent of the demand for this grain that may be expected. In addition to the growing interest taken in Kafir by the larger manufacturing industries already mentioned, there is a demand from many small feed dealers scattered throughout the entire country that, in the aggregate, becomes a factor that must be reckoned with. One of the large handlers of Kafir told the writer a few days ago that his firm was selling to quite a number of small feed and grain dealers, as well as millers, in Kansas, Oklahoma and Missouri, who had never bought any quantity of Kafir before. Another shipper stated that on the same day he had sold Kafir in car lots to Los Angeles, Cal., and to Bangor, Maine.

At the time this is being written, corn is selling on the Kansas City market at prices equal to $1.16 per 100 pounds, and Kafir at 95 cents. The price difference is still greater in the Southwest, where Kafir is grown. Not only are many farmers holding their Kafir and feeding it instead of corn, but it is reported that many of those fortunate enough to have grown a fair crop of corn are selling their corn and buying Kafir as a feeding substitute, thus taking advantage of the wide difference now existing in the prices of the two grains. There are close observers of the market who predict that Kafir and Indian corn will sell at the same price before next May.

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To cast a footing of totals at the conclusion of this attempt to give an unprejudiced account of the value and importance of Kafir corn, particularly to the people of the southwestern states, it seems that this new arrival has already made it unnecessary for the farmer whose location is such that the growing of Indian corn is not a success, as well as for those whose prosperity depends upon his prosperity, to despair. Kafir corn places them upon a more equal footing with the people living in the Mississippi or Missouri River valley, where corn is the principal crop. The general introduction of Kafir culture on the millions of acres of western land, where the successful raising of any other crop is uncertain, will mark a most important epoch in the agricultural history of that territory. The government crop report for November, 1911, speaks volumes when it presents the following statement regarding the Oklahoma crops: "The condition of corn at harvest time was 25 per cent; of Kafir corn, 79 per cent."

KAFIR CORN IN BUTLER COUNTY, KANSAS.

From an address to the Oklahoma Bankers' Association, by J. B. ADAMS, El Dorado, Kan.

In from fifteen to twenty years of experience in the production of Kafir corn (we raise the Black-hulled Kafir almost exclusively, although some prefer and plant the Red) we have established three indisputable facts, the common experience of all our farmers, namely:

First: We have demonstrated conclusively that Kafir corn is a never-failing upland crop. In all our twenty years' experience we have never had a single failure. Some years, of course, the crop is larger than others; some farmers raise more than others on the same kind of soil under parallel conditions, as is the case with any other crop; but everybody who plants Black-hulled Kafir, and cultivates and cares for the same with any degree of intelligence whatever, raises a crop.

Second: Kafir corn is positively no more exhausting to the fertility of the soil than any other crop, if as much so. I personally know of upland farms that failed for twenty years to produce Indian corn, that have grown Kafir continuously and successfully, and in each instance for the last fifteen years with apparently no decrease in the yield. To be sure, I would not advise any farmer to put the same field in Kafir or any other crop without change for fifteen years, or even a much less number of years, because a depletion of the soil is inevitable, but it has been done in our county with incredible results. It is true that Kafir has a great affinity for moisture, and this has made it seem hard on the land. But this is the armor it wears against the sun and in which it fights the heat and the wind. If there is the slightest trace of moisture in the soil the Kafir will get it, and that is why it is able to withstand long periods of drouth. It naturally leaves the soil very dry, but it does not draw more heavily upon its storehouse of fertility than Indian corn, if so much so. The old idea that you hear so frequently repeated, and that in some mysterious way has gained widespread credence, that Kafir corn is hard on land, is an exploded delusion in Butler county.

Third: We have proved to our entire satisfaction, to the point of al-

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most universal acquiescence and approval, that Kafir is almost the equal of Indian corn for the purpose of feeding or fattening live stock, and that it can be successfully and satisfactorily used for any purpose for which Indian corn is used, even to the making of "flapjacks"; that horses can be fed for field work or for the track and cattle and hogs fattened and prepared for the market the same as with Indian corn. The only difference is that the Kafir must be ground and about 10 per cent more in quantity fed at a feeding. Many bunches of cattle have been full fed this winter in Butler county on Kafir corn and cottonseed meal mixed, or corn and Kafir chop, in equal parts, mixed with an addition of cottonseed, that sold on the market with no discrimination whatever in quality or price.

These facts give Kafir corn a place from which it can not be dislodged and which should bring it to the favorable consideration of farmers wherever it can be successfully raised.

Kansas and Oklahoma are very much alike both in soil and climate. If we raise Kafir corn in southern Kansas, as we do, you can raise it in Oklahoma. The experience of Butler county, I undertake to say, can be repeated in every upland county in Oklahoma. It occurs to me that it is a very desirable thing to do. With Kafir corn you can be absolutely sure (and safety is a whole lot) of your forage and roughness, and of considerable grain to sell besides, no matter how dry the year or how unfriendly the climate. You raised more Kafir in Oklahoma in 1911 than ever before in your history, and wherever tried it was invariably a success. With three successive failures of Indian corn, and the success your farmers have already had with Kafir, they ought to be convinced. But the stubborn fact remains that, if they are convinced, they will not act. In Butler county it took years of preaching and urging, years of constant effort on the part of bankers and merchants, long after the value of Kafir had been conclusively demonstrated, to get many of our farmers started on the right track. You will have the same experience. In the face of overwhelming evidence, your farmers, like ours, will be slow to act, unless offered some incentive.

I fully appreciate that theory is one thing and experience quite another. I would not recommend that farmers plunge headlong into the attempted production of Kafir. Notwithstanding they can learn from our Agricultural Experiment Station and our farm journals, they will yet have much to learn from experience. I would not advise the planting of more than twenty acres as a first experiment, increasing the acreage as the farmer grows in knowledge. Many will fail the first year from one cause or another, but this should not deter further effort. It is a peculiar fact known to our farmers that the Kafir will improve on increased familiarity with the soil. For best results plant the same field next year with its own seed, if the seed is good.

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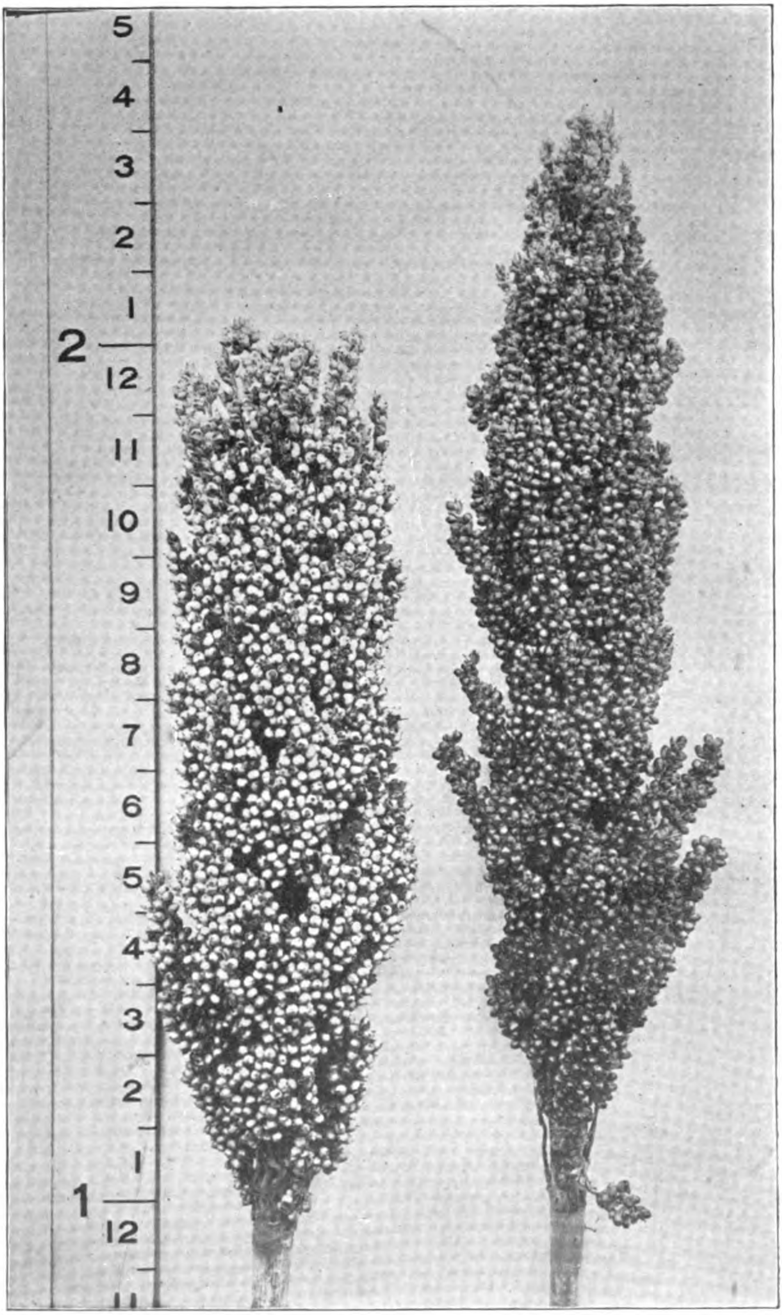

White Kafir corn. Red Kafir corn.

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BETTER GRAIN-SORGHUM CROPS.

From Farmers' Bulletin No. 448, U. S. Department of Agriculture, by CARLETON R. BALL, Agronomist in Charge of Grain-Sorghum Investigations.

INTRODUCTION.

By grain sorghums is meant all the different varieties of the groups of sorghums called milo, Kafir, durra, and kowliang. Of these groups only the Kafirs are grown to any extent for forage, apart from the grain. The other groups are known almost wholly for the yields of grain.

By improvement is meant changes both in the habits of the plants themselves and in the methods of handling them. These changes must be such as will make them better yielders or otherwise better adapted to the needs of the grower. Some of these changes will be in the matter of purer varieties, greater drought resistance, increased earliness, dwarfer stature, better heads, thinner seeding, and machine harvesting.

In many localities unimproved varieties are being grown. Most farmers can improve their local varieties. Some of them do so to a very creditable extent; others neglect this entirely. Such work should be much more generally done, and probably would be if the methods of doing it were more commonly understood. In other communities improved varieties have been introduced and are grown by most of the farmers. The work of improving them must be continued by the growers, however, or the varieties are likely to become gradually poorer. This is caused by accidental mixtures of seed or by crossing with other varieties or with unimproved strains of the same variety.

The annual loss from smut is serious, in the Kafir varieties, especially, though it may readily be prevented. The milo varieties are not affected by smut under any circumstances.

The grain sorghums are most largely grown in the southern half of the Great Plains region. Broadly speaking, this includes the plain between the ninety-eighth meridian of longitude and the Rocky Mountains. The southern half of it may be said to include the area between the northern boundary of Kansas and the Mexican border, although the extreme southern part of western Texas does not belong to the plains proper. The area thus bounded takes in the western half of Kansas, the western third of Oklahoma, the western half of Texas, and all of Colorado and New Mexico lying east of the mountains. In round numbers it is 400 miles wide and 1000 miles long. So important are these crops in this area that it may well be called the "grain-sorghum belt."

The surface is in general a gently rolling plain, sloping steadily eastward from an elevation of 4000 to 5000 feet at the base of the Rockies to an average elevation of 1000 to 1500 feet at the ninety-eighth meridian. The highest section in these plains is not at the base of the mountains but some distance east of them, in Elbert and El Paso counties, Colorado, where the altitude increases to nearly or quite 6500 feet. While the main slope is toward the east, there is also a secondary slope to the north and south from this high area in Colorado. Looked at from

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above, the surface of the whole Great Plains region may be compared in outline to half of an inverted saucer, the rim lying toward the east.

The soils vary from the dark clays of the central Panhandle and the red clays of western Oklahoma, through sandy loams, found in scattered areas throughout the whole region, to very sandy soils such as characterize the sand-hill country of Kansas and Colorado.

The plant covering of the loams and clays is mostly a dense sod of buffalo grass and blue grama mixed. In general these are called "tight" lands or "short-grass" country. In southwest Texas the buffalo grass gives place to the curly mesquite (*Hilaria cenchroides*), or running mesquite, as it is often called. On the more sandy soils are found taller and more bunchy grasses, such as the bluestems (*Andropogon* spp.) and the needle grasses, or wire grasses (*Aristida* spp.). In much of western Texas the plains have been largely covered by a more or less dense growth of the mesquite tree (*Prosopis*). In southern Texas this becomes a large tree, but as it ascends to the higher plains its size diminishes until in the upper Panhandle it is only a low shrub or bush.

CLIMATE.

What really separates the so-called plains region from the country lying immediately east of it is, primarily, not differences in either elevation or soil, but the lower rainfall and higher evaporation of moisture. The average annual rainfall for the grain-sorghum belt, as defined above, is about twenty inches, varying in different parts from fifteen to twenty-five inches, of which more than half comes in the months of April to September, inclusive. The summer temperature is fairly high, and this, with the steady winds which prevail over much of this area, makes evaporation rapid and continuous.

All crops to be suitable for use in this area must have the ability either to withstand or to escape drought in one way or another. Dry, hot winds occasionally occur in some parts of the region, often quickly and completely destroying all tender vegetation. At the higher elevations and in the northern part generally the season is comparatively short. Late spring frosts occur and the first frosts of autumn come rather early. Early varieties must therefore be used.

AGRICULTURAL DEVELOPMENT.

The process of dividing the great cattle ranges and selling them for farms is going on steadily. Wherever government land remains, homesteads are being taken up. In the past few years the settlement of this dry country has been very rapid. Rapid settlement may be desirable; it is much more important, however, that it be permanent. This has not always been the case. More than once considerable areas have been largely abandoned after having been quite well settled and improved. The abandoned farms reverted first to weed crops and finally to grass and sod. These conditions were true in the early eighties and again in the early nineties. The principal cause was a series of unusually dry seasons. Loss of crops starved out many settlers who had little capital to carry them through such crises.

It is quite probable that such unfavorable periods will occur again.

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Plains settlers must prepare to endure them with as little loss as possible. In two important ways the farmer is much better equipped than he was. Better and more drought-resistant crops and crop varieties have been found or produced, and better methods of tilling the land in dry regions have been developed.

No one may say with certainty just what the agricultural future of this southern plains region is to be. It gives promise of becoming a second great feeding belt, similar to the corn belt. The comparatively mild winters and nutritious grasses which made it a famous grazing country will help to make it a famous feeding area. It is true that the native range carries only one head of stock the year round on each twenty-five to fifty acres, owing to the small size and slow growth of the grasses. However, the carrying capacity per acre may be enormously increased by supplementing the native pasture with crops supplying forage and feeding grains.

Nothing better could be wished than that this area should grow live stock and the crops to feed them. Under such a system of farming it would produce many more live stock than it ever did or could under the ranch and range system. If it should raise a money crop in addition, so much the better. This might be cotton in the southern part, winter wheat in the central, and spring wheat in the northern part, with broom corn and other minor crops in different parts. The area is admirably adapted to growing both the stock and the necessary feeding crops.

ADAPTATION TO THE GRAIN-SORGHUM BELT.

It is in the region described that the grain sorghums prove themselves most completely at home. They are not only staple crops here, but are in many cases the chief dependence of the new settler. This is because they may be grown as sod crops. By homesteaders with small means and limited equipment they can be cheaply planted on breaking. They are often planted, cultivated, harvested, and even thrashed by hand under such circumstances.

When these crops were first introduced they were tried in various parts of the United States. One after another they were found unsuited to the conditions in most of the country and were discarded; but out on the plains they grew in favor with the farmer because they were able to withstand the prevailing conditions. They are able to grow and make profitable yields in hotter, drier climates than most crops. Some of them are early enough for use at comparatively high elevations. They are all cultivated crops, entering readily into the rotation with spring-sown small grains. They furnish the feeding grain required on the farm; also some roughage, and occasionally both fuel and food in addition. The surplus can always be sold at fair to good prices. When grown on a large scale they are handled rapidly and profitably by machinery in every necessary operation from seeding to milling. They are undoubtedly suited to become the basis of a cattle-feeding industry that will make the plains farmer prosperous.

USES OF THE GRAIN.

Feed for Live Stock.

Primarily these grains are and ought to be used in feeding live stock on the farms where grown. This is due to their history as well as to their adaptations. They were the principal crops of the early settler in the dry-land areas of the southern plains region. He not only needed a feeding grain, but was often too far from market to sell profitably if he had wished.

The value of the grain for keeping work stock, growing animals, and dairy cows in excellent condition has long been recognized among the growers. The knowledge of its value in fattening cattle and hogs for market is increasing. A number of experiments to determine the feeding value have been conducted at the agricultural experiment stations of Kansas,[*] Oklahoma,[†] and Texas.[‡] In many of these trials the Blackhull Kafir grain, which was most generally used, was shown to have a feeding value but little below that of corn. Chemical analyses of the grain show it to contain slightly more protein and starch and a little less fat and fiber than corn. The somewhat lower feeding value seems to be due to lower digestibility rather than to any particular difference in composition.

The grain should be carefully ground before feeding in order to get the best results. In the form of milo chops and Kafir chops it is becoming a popular commercial article. Chops are made by grinding or crushing the thrashed grain more or less finely. Head chops are made by chopping or grinding coarsely the unthrashed heads, and are therefore similar to corn-and-cob meal. Head chops are not meeting with as much favor as chops, because they contain considerable so-called "dirt," which is composed of the glume hairs, awns, and fragments of the glumes and branches of the heads. For this reason many grain elevators in the plains region have been equipped with machinery for thrashing and grinding these grains. They are thus enabled to buy these crops in the head and to thrash and grind them at their leisure in order to prepare them for the market.

Poultry Feed.

The grain-sorghum seeds are splendidly adapted, both in size and composition, for feeding to all classes of poultry. In many parts of the country, far outside of the grain-sorghum belt, small patches of Kafir, durra, or other "chicken corn" are commonly grown on the farm, simply to furnish chicken feed. It is probably a conservative estimate that Kafir or other grain-sorghum seed forms fully 25 per cent of the prepared

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[*] Experiments with Kafir Corn; Bulletin 56, Kansas Agricultural Experiment Station, 1896, pp. 165-167.

[†] Digestion Experiments and Fodder Analyses; Bulletin 37, Oklahoma Agricultural Experiment Station, 1899, pp. 1-20. Summary of Digestion Experiments with Kafir; Bulletin 36, Oklahoma Agricultural Experiment Station, 1898, pp. 1-4. Digestion Trials; Bulletin 46, Oklahoma Agricultural Experiment Station, 1900, pp. 1-8.

[‡] Information Regarding the New Feed Law; Bulletin 95, Texas Agricultural Experiment Station, 1907, pp. 1-24. Kafir Corn and Milo Maize for Fattening Cattle; Bulletin 97, Texas Agricultural Experiment Station, 1907, pp. 1-20. Digestion Experiments; Bulletin 104, Texas Agricultural Experiment Station, 1908, pp. 1-33. Steer-feeding Experiments; Bulletin 110, Texas Agricultural Experiment Station, 1908, pp. 1-23. Panhandle Feeds for Beef Production; an unnumbered and undated circular of two pages of the Texas Agricultural Experiment Station.

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poultry food sold in this country. So strong is the demand for these grains by the manufacturers of poultry food that similar varieties have been imported from as far away as India when the crop in this country was short.

Human Food.

Meal made from the grain sorghums, ground locally, is not infrequently used in the making of batter cakes and similar articles on the farm. The general testimony is that these are delicious in quality. Some experiments are now being conducted in a small way to determine the value of the meal for more extended use. There seems little reason why, when properly milled, it should not be used in much the same manner as corn meal. Throughout Africa, India, and the other parts of southern and eastern Asia, where these crops are largely grown, they are not only commonly used as human food, but in many countries they furnish the chief article of diet.

As already pointed out, the grain sorghums are all grown most extensively in the drier areas west of the ninety-eighth meridian. In Kansas, during the period from 1907 to 1909, inclusive, about 94 per cent of the milo, about 45 per cent of the Kafir, and about 25 per cent of the corn were found west of this line, which divides the state almost exactly in half. In Oklahoma about one-third of the state lies west of this line and contains 97 per cent of the milo and 79 per cent of the Kafir, based on averages of five and six years, respectively.

The 46 counties in the western half of Kansas grew, in round numbers, 240,000 acres of grain sorghums in 1907, 334,000 acres in 1908, and 396,000 acres in 1909. This was an increase of 39 per cent in the grain-sorghum acreage for 1908 and 18.6 per cent for 1909. The same counties grew 1,500,000 acres of corn in 1907, 1,750,000 acres in 1908, and 2,000,000 acres in 1909, increases of 17 and 14 per cent, respectively. The ratio of the acreage of grain sorghums to that of corn was 1 to 6.2 in 1907, 1 to 5.3 in 1908, and 1 to 5.1 in 1909. The grain-sorghum acreage was therefore equal to 16.1 per cent, 18.9 per cent, and 19.5 per cent of the corn acreage of these three years, respectively. Ten of these counties grow larger areas of grain sorghum than of corn.

In the 21 counties now comprising the western third of Oklahoma there were grown 327,000 acres of grain sorghum in 1906, 423,000 acres in 1907, 465,000 acres in 1908, and 580,000 acres in 1909, increases of 29, 10, and 25 per cent, respectively. The ratio of grain-sorghum acreage to that of corn was 1 to 2.1 in 1906, 1 to 2.7 in 1907, 1 to 3.1 in 1908, and 1 to 3.07 in 1909. These ratios represent grain-sorghum acreages equal to 47.6 per cent, 37 per cent, 32.2 per cent, and 32.6 per cent of the corn acreage for the same years. Three or four of these counties grow more grain sorghums than corn.

Summary of the Values of Grain Sorghums and Corn.

In the following table I is given the minimum, maximum, and average value per acre of the grain-sorghum and corn crops in Kansas and Oklahoma. It will be noted that for Kansas the minimum acre value of the combined grain sorghums is not as low as the minimum for corn; that the maximum is nearly as high, and that the average acre value is higher by 45 cents an acre. In Oklahoma the facts are exactly reversed.

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TABLE I.—*Summary of value of grain sorghums and corn in Kansas and Oklahoma.*

State and crop.	Number of years averaged.	Yield per acre.	Price.	Acre value.				
				Minimum.		Maximum.		Aver. for period.
				Year.	Value.	Year.	Value.	
Kansas:		*Tons.*	*Per ton.*					
Kafir	6	2.99	$3 48	1906	$9 18	1909	$11 21	$10 33
Milo	6	2.53	3 87	1906	8 31	1907	10 61	9 52
Total grain sorghums	6	2.95	3 48	1906	9 16	1907	11 10	10 28
		Bushels.	*Per bu.*					
Corn	6	33.1	$0 44	1904	7 81	1908	11 71	9 83
Oklahoma:								
Kafir	6	11.0	45	1904	3 92	1907	7 77	5 56
Milo	5	13.8	44	1909	2 55	1907	8 64	6 31
Total grain sorghums	6	11.6	45	1904	3 92	1907	8 00	5 68
Corn	6	19.4	43	1904	6 24	1906	11 21	8 29

Two facts must be kept in mind while comparing these figures. One is that for Kansas the yields and values of grain sorghums are based on tons per acre and thus include the value of both grain and stover. The yields and values of corn, on the contrary, are based on bushels of grain per acre. If the value of the corn stover were also included, the average acre value for corn would probably somewhat exceed that of the grain sorghums. The difference, however, would probably not be as large as in the case of the Oklahoma figures. The other fact is that the grain sorghums are most largely grown in the western part of these states. Here the shorter seasons and lower rainfall tend to decrease the yields of all crops. This puts the sorghums at a disadvantage in a comparison with corn, which is most extensively grown in the lower and more humid portions.

IMPROVING THE GRAIN SORGHUMS.

In general there are two ways by which the grain-sorghum crops can be made of greater value to the grower. The first is by improving the varieties; the second, by finding more rapid and economical methods of harvesting. Improved varieties can be obtained through selection of present sorts and by bettering the methods of growing them. More rapid and economical harvesting will come about either through adapting the crops to present machinery or through the invention of new machines, or both.

There are five principal ways in which improvements may be made: (1) Increased drought resistance, (2) increased earliness, (3) dwarfer stature, (4) greater productiveness, and (5) increased machine harvesting.

Drought Resistance.

The grain sorghums are most useful in regions where moisture is often the controlling factor in crop production. Much good should therefore be accomplished by increasing their drought resistance, especially in the areas of lighter rainfall.

No one knows exactly what drought resistance is. It is probable that what we call drought resistance is the effect of several different factors. The most important of these factors are probably (1) increased ability to prevent the loss of water by transpiration, (2) increased development of the root system, and (3) a possible increase in power to extract water from a dry soil.

Differences in the power to control transpiration are well-known and readily observed facts. By transpiration is meant the passing of water from the tissues of the plant into the air. In the processes of their growth all plants are constantly absorbing water from the soil through their rootlets and allowing certain quantities of this moisture to pass out into the air through minute pores, called stomata. This is done in much the same manner as water escapes through the animal skin in the form of perspiration. In times of drought it is important that the plant lose as little as possible of its water supply in this way. The plant best fitted to prevent transpiration is thus the most drought resistant. In cacti, for instance, this ability is highly perfected. Corn is much less drought resistant than the members of the various groups of sorghums. Corn is in danger when the leaves begin to curl, but sorghums often remain in this condition for a long time without permanent injury.

The size and character of the root system is probably a strong factor in drought resistance. The larger the root system in proportion to the plant, the better it can supply moisture. The wider and deeper its penetration, the larger the area of soil from which it draws moisture in time of drought. A deeply rooting plant may be able to secure water when shallow root systems lie wholly in dry soil. This is entirely apart from possible differences in ability to extract moisture from a given unit of soil. Such differences may exist, but the idea is only a theory as yet. Unfortunately, the character of the root system can not be observed while making selections.

Selections for drought resistance will naturally be made on conditions that can be seen with the eye. These are likely to be the results of a combination of means for actually resisting drought and for evading drought. Dwarfness, earliness and thin stands are means or conditions for drought evasion. By making allowance for them, when present, one can select for actual drought resistance. This will be done by using those plants which give best results under drought conditions when they are neither dwarfer nor earlier nor more thinly planted than their neighbors.

Earliness.

There are two principal reasons for desiring early varieties. The first is to extend the range of grain sorghums into dry regions having a short growing season. The second is to secure the fullest possible benefit from the seasonal rainfall, which comes largely during the early summer months in parts of the grain-sorghum belt. The second reason is thus connected with the problem of drought resistance, though, as pointed out, earliness is a means of drought evasion, not of resistance. Improvement in earliness will need to be continued for a long time if varieties are to be perfected for the needs of all the dry-farming regions.

EARLY VARIETIES. The milos are much earlier varieties than the Kafirs and are very promising material on which to work. In the Panhandle of Texas, at elevations of 3000 to 4000 feet, they now mature in 90 to 100 days when sown May 15 to 20. At present they are grown successfully

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up to an altitude of between 4000 and 5000 feet in Texas, New Mexico, and Colorado. At higher elevations the growing season is shortened to such an extent that the present varieties of milo do not mature. At lower elevations their present range extends northward into southwestern Nebraska. In northern Nebraska, the Dakotas, Montana and Idaho the increasing latitude and shorter growing seasons prevent their successful maturing. It seems certain, also, that the soil, especially at night, is too cool to permit vigorous growth, thus retarding the maturing of the plant even where the season is otherwise long enough.

The durra group contains some very early varieties. The only one well known in this country is the common White durra, which has been called "White Egyptian corn," "Rice corn," and "Jerusalem corn" in the successive periods of its popularity. It matures as early as or slightly earlier than the milos. White durra apparently possesses true drought resistance also and is a good yielder, but shatters quite badly, and is not liked for that reason and some others. Some hybrids of this variety with Blackhull Kafir have been under selection for three years and give promise of being valuable.

The Kafirs usually require about three weeks longer than milo to mature under the same conditions. An early strain of Blackhull Kafir developed by the writer, through selection, matures about two weeks earlier than the ordinary Kafirs and only three to five days later than milo. The old-fashioned White Kafir with white hulls, now rarely found in cultivation, was a semi-early sort and would make good selection stock if its heads were free from the boot and if it was not so readily attacked by diseases. Red Kafir, which is normally a week or more earlier than the Blackhull in the low plains, seems to become proportionally later as it is carried westward to higher elevations. At the Amarillo experiment farm it has been consistently later than the Blackhull variety during a period of several years.

The group of kowliangs from northern China and Manchuria contains some varieties which are naturally very early, especially among the brown-seeded sorts. Three of these have matured in eighty to ninety days, thus proving earlier than the milos, in the Panhandle of Texas. Some promising selections from them have been made in northern Colorado, in Nebraska, and in South Dakota. Coming, as they do, from latitude 40° or higher, they may prove able to germinate and grow at lower temperatures than the groups which have come from more southern latitudes.

EARLY CROPS AND EARLY SEASONAL RAINFALL. The effect of earliness in permitting drought evasion is very important. Consider two plants, one earlier than the other, but otherwise similar in all respects. The earlier plant, having a shorter growing period, not only uses less water, but uses it earlier in the season. This is of especial importance in those parts of the semiarid country where much of the seasonal rainfall occurs in April, May and June. The earlier plant might be able to mature its crop of seed on the summer rainfall. On the other hand, the later plant might be crippled at a critical stage by the exhaustion of the soil moisture during dry weather in August. It is fairly certain that in much of the plains region the greater part of the soil moisture in a field is not used

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by the growing plants, but is lost by evaporation under the average tillage conditions.

Milos are earlier than Kafirs, but are not known to be more truly drought resistant. At Amarillo, Tex., under conditions of severe drought from the middle of July until October, 1909, the milos yielded on the average 8.3 bushels and the Kafirs only 5.5 bushels to the acre. In each crop the figures are the average of between 20 and 30 plats, and show that the difference was really in the earliness (and perhaps dwarfness, also) of the milos as compared with the Kafirs, the yields in normal years being about equal.

The season of 1910 was still drier, only ten inches of rain falling at Amarillo from January to October, inclusive. Better yields were obtained than in 1909, however, because the average stands were much thinner. Under these conditions 32 plats of milo and dwarf milo yielded an average of 17.9 bushels per acre, while 22 plats of ordinary Blackhull and Red Kafirs yielded only 3.7 bushels. The difference in average yield is 14.2 bushels. Even if we admit that half of this difference is due to the dwarfer growth of the milos compared with the standard Kafirs, we still have a gain of 7.1 bushels due to earliness alone.

The relative values of earliness and dwarfness are further indicated in results obtained from three strains of Blackhull Kafir. The writer has produced by selection an early strain of the Blackhull Kafir which is nearly two weeks earlier than the ordinary strains, although of the same height. In 1908, a favorable season, it yielded about 10 per cent less than the average of the ordinary Blackhull varieties. In 1909, however, it yielded 10.7 bushels to the acre, while 20 ordinary strains averaged only 5 bushels and the best of them yielded only 10.9 bushels. In 1910, under the conditions described, it produced 7.57 bushels compared with 2.95 bushels from 15 standard plats.

Another early strain, which is also dwarf, growing to a height of about 4 feet, yielded in 1908 about 4.5 bushels less than the average of the ordinary taller and later strains. In 1909 it yielded 14.4 bushels, compared with 10.7 bushels from the tall but early strain and an average of only 5 bushels from the ordinary taller and later strains. In 1910 it yielded 9.28 bushels, while, as noted above, the tall early strain produced 7.57 bushels and the ordinary strains only 2.95 bushels per acre. These figures indicate that in 1909 about 40 per cent and in 1910 about 27 per cent of its increased yields were due to its dwarfness and 60 per cent and 73 per cent, respectively, to its extra earliness.

SELECTING FOR EARLINESS. Earliness can be developed only by continued selection. Such selections can be made either at heading time or at the time of ripening, but are preferably the results of records made at both periods. When the field or seed plat of the variety begins to head, a number of the earliest heads, which are otherwise suitable for selection, should be marked by means of tags on which is recorded the date of heading. When the heads on these selected stalks begin to show the characteristic colors and texture of the hard-dough or ripening stage, the date of ripening should be added to the tags. Other things being equal, those heads for which the shortest time has elapsed between heading and ripening are to be considered the earliest. These should be care-

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fully saved separately and used for continuing the work another season.

In dry regions, where the amount of moisture in the soil commonly controls the growth of the crop, the plants at the ends and sides of a field are often the first to produce heads, especially in dry seasons. This is because the outside plants have a larger area from which to draw moisture, or because run-off water often collects at the edges of fields and provides extra moisture. These early heads will be the first to ripen, but it does not follow that these plants are naturally earlier than the rest of the field.

Dwarf Stature.

For the grain-sorghum grower a dwarf variety has two advantages over the taller strains. It requires less water and can be harvested with a grain header.

The larger the plant the more water it requires and the more it is likely to lose by transpiration. A small plant which can produce as much grain as a large plant will thus have a real advantage in a dry season. This is not true drought resistance, but merely a lower water requirement which permits drought evasion.

As previously noted, the year 1909 was marked by severe drought during July, August and September in the southern half of the Great Plains. At the Amarillo experiment farm, in Texas, 17 plats of milo gave an average yield of 6.8 bushels and 10 plats of dwarf milo an average yield of 11 bushels to the acre. The best plat of milo yielded at the rate of only 16.5 bushels, though in a low piece of ground, while the best dwarf milo yielded 23.2 bushels per acre. In 1910 there was not as much difference. Eight plats of milo yielded an average of 16.2 bushels per acre, and 7 plats of dwarf milo yielded an average of 19.6 bushels. The advantages in favor of the dwarf variety seemed to be largely due to the smaller size of the plants and the consequent lower water requirement.

The case of the dwarf and also early strain of the Blackhull Kafir has already been noted under the discussion of earliness. How much of its increased yield was due to dwarfness and how much to earlier maturity can not be certainly known. Apparently about one-third was due to its dwarfness and two-thirds to its earliness.

The production of dwarf varieties has made possible the use of the grain header in harvesting the crop. A few ingenious farmers have succeeded in raising their headers on timbers until they will cut, with fair satisfaction, the ordinary tall varieties, but it is not likely to become a general practice. In case a successful row header is invented it is more likely to work well on low varieties than tall ones, especially in windy regions.

Selecting for dwarf stature raises the question of the ability of a plant to produce as large seed yields after the stalk and leaves have been reduced in size. How far can reduction in the size and height of stems be carried without reducing the total leaf area? How far can reduction of leaf area be carried without reducing grain production? These questions can not be answered except by long-continued investigations. The limits of profitable reduction in size will vary with climatic conditions of different regions. While these limits are not yet fully

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known for any region, there is fair proof that the standard varieties of the central plains region can be much reduced without passing the lower limit. The dwarf milo and dwarf Kafir are only three to four feet in height under conditions that make the normal crop five to six feet in height. The dwarf milos outyield the standard milos even in favorable seasons. The White durra, which is low, yields as much as the Kafirs, which are of medium height or taller. The dwarf Kafir, although recently produced, seems likely to hold its own in a series of years. An extra-dwarf Brown kowliang has been obtained in China. It grows to a height of about two feet, but, like most newly introduced sorghums, does not show high yielding power.

These crops have originated in subtropical lands and are commonly inclined to large growth. While they have been used chiefly for grain production in their native homes, it has been by more or less primitive peoples, and the returns have not been large. Since coming to this country most of the standard varieties have been reduced in size and at the same time increased in yielding power. The limit of profitable dwarfness has probably not been reached; it certainly has not been passed.

Productiveness.

The two keys to increased grain yields are better varieties and better methods of growing them. Better varieties mean pure and smut-free crops, with better filled and perhaps larger heads, erect and fully exserted from the boot, borne on stalks with fewer suckers and no branches. Better methods relate to proper and even spacing of stalks in the row and to thorough cultivation of the growing crop. They also include proper rotations and suitable tillage of the land when not in crop. Selections for better yields may naturally be continued as long as the crop is grown. No one may say what returns will finally be obtained. We may reasonably hope, by continued effort, to increase greatly the present average yields.

PURE VARIETIES. Extended travel and observation in the grain-sorghum belt show that many of the fields of different Kafir and milo varieties are not pure. The same is true of the fields of sorgos or sweet sorghums and of broom corn. This condition comes from two causes, mixtures and hybrids. Usually both are present, because mixtures quickly result in hybrids.

The advantages of pure crops are many and easily seen. Pure varieties are most likely to be uniform in height and in time of ripening, and hence are easy to harvest. The grain is of much greater value for seed purposes, and also obtains a higher grade and commands a better price on the grain market. It is also better as a feeding grain, because more uniform in quality.

Mixtures readily result from carelessness in cleaning empty bags, bins, wagons and separators, or in storing the seed. Most of the mixing from these causes may be easily prevented. The presence of other varieties as volunteer crops in the fields is also a common cause of mixtures and one not so easily controlled. Early Amber sorgo and related strains are very common and troublesome volunteer crops in western Kansas and Oklahoma. The damage done by these mixtures of varieties can be

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largely remedied by roguing the fields; that is, removing by hand all plants not true to the variety grown. Where not possible to rogue an entire field, a part may be cleaned and the seed saved from that portion.

Crossing or hybridizing is more common in the sorghums than in most other farm crops. This is because they are all open fertilized; that is, intended to be cross-fertilized by means of the wind. The three stamens (pollen-bearing or male part of the flower) and two pistils (pollen-receiving or female part of the flower) all appear outside the glumes or hulls of the flower in the early morning. The anthers or pollen sacs open at the end, and the pollen grains are quickly emptied into the air as the anthers swing in the wind. The pollen is quite as likely to be carried on the breeze to the flower on some other plant as it is to fall upon the pistils projecting from the flowers on the same plant. The ease with which such crossing occurs is increased because these crops are most largely grown in regions of fairly constant winds and because their greater height enables the wind to carry the pollen farther than in the case of lower crops.

Crossing is likely to occur whenever two varieties are growing near each other if they are in flower at about the same time; hence, whenever mixtures of different varieties are found in a field, hybrids are almost certain to be formed and to appear in the crop the following year. In the grain-sorghum belt many of these are caused by the presence of Early Amber and other volunteer sorghum varieties in the fields of nearly all farms. Hybrids also result from planting the fields of different varieties too near together. Just how far apart the fields should be to insure safety from hybridizing is an open question. In the Great Plains area the prevailing winds are from the south and the alternating winds usually from the north. Crossing, therefore, takes place at greater distances in a north and south line than in an east and west line. Where two fields lie north and south from each other, a distance of eight or ten rods would probably be required, and fifteen or twenty rods would be preferable. Where the fields lie east and west from each other, the crops would be fairly safe from crossing at shorter distances than those stated.

SMUT-FREE VARIETIES. There are two kinds of smut affecting sorghums—head smut, and kernel, or grain, smut. In the former the young head becomes a black mass of smut spores, inclosed at first in a grayish covering or membrane. In the kernel smut the seed is the only part visibly affected. The head looks much as usual, except that in the case of white-seeded varieties it is much darker in appearance. The seeds are replaced by longer gray smut kernels full of black spores. These smuts occur on all kinds of sorghums except milos. Neither smut has ever been found on the varieties of the milo group.

The head smut is not very common, which is fortunate, because no means of controlling it is yet known. The kernel smut is quite common, and often completely destroys from 2 to 10 per cent of the heads in a field, reducing the yields of grain in the same proportion. It can easily be controlled by the modified hot-water treatment or by the use of formalin.*

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* Full directions for using these treatments are given in Circular 8, revised, Bureau of Plant Industry, U. S. Dept. of Agriculture, entitled "The Smuts of Sorghum," which may be obtained free on application to the Secretary of Agriculture, Washington, D. C.

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BETTER YIELDING VARIETIES. Better yielding varieties may come originally from an experiment station or other source, or they may be produced by the farmer himself from his own fields. In either case the grower must continue the selection from year to year. In its simplest form this will mean the selecting of stalks of desirable size and habit, bearing large and well-shaped heads, well loaded with plump grains. This requires, of course, that the work of selection be done in the field. Heads selected in the bin or crib tell little of the stalk on which they grew. The work should be done before harvesting begins, and a sufficient quantity selected to furnish plenty of seed for the farm crop of the next year. Where early selection of seed has been neglected the selections may still be made during harvest, if harvesting is done by hand. A small box, fastened to the near side of the wagon bed, will serve to receive the selected heads. Careful selecting is not likely to be done, however, in the hurry of harvest. Where machine heading is practiced this method is, of course, not possible.

The selected heads may be hung up in a dry place or laid in thin layers on shelves and thrashed in the spring. If they are thrashed in the fall, the seed should be carefully stored in a cool room, and preferably in bags rather than in bins. There is much danger of lowering or destroying its vitality if it is allowed to heat.

DESIRABLE FORMS OF HEADS. *Well-filled Heads.*—It is important that the heads be well filled at the butts and tips, as in the case of corn ears. Less attention has been given to this matter than it deserves. The heads selected should have shorter branches at the butt than in the rest of the head. These lower branches should be loaded with seed down to the point where they join the rachis or central stalk of the head. Long basal branches are likely to droop and finally break away under the combined stress of weight and wind.

Fully Exserted Heads.—It is also important that the head be fully exserted from the boot, or upper leaf sheath. No seed is produced on the part not exserted, which often becomes moldy or rotten if wet weather prevails. Corn ear-worms (*Heliothis obsoleta*) and false army worms (*Laphygma frugiperda*) breed in such places and add to the injury. When these heads with spoiled butts are piled with others they are likely to cause damage to the whole heap. Varieties in which the heads are not fully exserted are also more difficult to harvest by hand or machine.

The main agricultural difference between White Kafir and Blackhull Kafir is that the heads of White Kafir never become fully exserted from the boot. White Kafir was the first Kafir variety to come into general cultivation in this country, but it has since been almost wholly discarded, largely for this reason. Blackhull Kafir, the present popular variety, bears the heads normally entirely free from the boot.

Large Heads.—In selecting for large heads the proportionate size of the stalks must always be considered. Not the largest head alone, but the largest possible head on the smallest stalk is the most desirable selection. The grain sorghums are for use where limited rainfall is the principal controlling factor in grain production. Larger plants use and transpire more water than smaller ones. Selection should be made where the stand is uniform and fairly thick, and should include the largest and best heads produced under such conditions. They should not be made from the outer row of the field or plat, or from places where the stand is thin, even though the larger heads are found in such places. From six to seven inches of row for each stalk is considered the proper spacing for milos and nine to ten inches for Kafirs in the higher plains.

Average Weight of Heads.—The average weight of heads varies with the stand and seasonal conditions. Close spacing of stalks in the row or an unfavorable growing season reduces the size of the heads, even if they are well filled. Wide spacing and favorable conditions cause larger and heavier heads. Under average field conditions the heads of milo and dwarf milo weigh from three to four ounces and those of durra varieties about three ounces each. In the Kafir group the heads are normally much heavier, weighing from four to six ounces, while kowliang heads vary between three and four ounces each.

PERCENTAGE OF GRAIN IN TOTAL CROP.* The percentage of grain in the total crop varies greatly with the character of the season in which the crop is grown and with the stand of stalks. Some experiments indicate that under ordinary conditions milo and dwarf milo will produce from 35 to 40 per cent of their total weight in the form of grain. In Blackhull Kafir, and probably Red Kafir also, the average will be about 25 per cent, on account of the heavy stalks and leaves of the Kafirs. For the kowliangs the proportion will be about the same as in milos. One plat of milo at the Dalhart experiment farm, Texas, in 1908 yielded 47.2 per cent of its weight in grain. Three plats yielded above 40 per cent. On the other hand, in seasons of drought or other unfavorable conditions the percentages of grain may fall to one-half or less of the averages given above.

FREEDOM FROM SUCKERS AND BRANCHES. All sorghums apparently have the habit of producing both suckers and branches. There is, however, considerable difference among the groups and varieties in this regard. Suckers seem to be produced normally, branches only under somewhat exceptional conditions. They will be discussed separately.

Suckers.—These are produced from the closely crowded lower nodes or joints of the stem, just at the surface of the ground. They appear in some cases almost as early as the main stalk itself, and in other cases not until the main stalk is well grown or even after it has begun to mature its seed. They may vary in number from one to ten or fifteen, according to the habit of the plant or to the particular environmental conditions, such as abundance of food, moisture, etc. Though their heads are usually smaller, suckers differ from the main stalk chiefly in height and earliness. They are usually rather lower and almost always later in maturing, often very much so. Where the latter part of a season is more favorable than the earlier, suckers often grow taller than the main stalk. Their difference in stature is objectionable only in harvesting, but their later ripening is a more serious matter.

The value of suckers in grain-sorghum crops is still a debated ques-

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* See Bulletin 203, Bureau of Plant Industry, U. S. Dept. of Agriculture, entitled "The importance and improvement of the grain sorghums," by Carleton R. Ball, for a discussion of tabulated results.

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tion. Many of the advertisements offering the seed of these crops dwell at length on their power to produce several stalks from one seed. Considering the cheapness of the seed of grain sorghums and the exceedingly small quantity (two to four pounds) needed to plant an acre, the grower can well afford to require only a single stalk from a single seed. In a forage crop, where abundance of leaves is wanted, suckers may be very desirable, but in a grain crop requiring little seed the weight of evidence is against them. Their existence may be partly justified by their help in making a fuller crop where a thin stand occurs. This is largely offset by their somewhat later maturing. It is a question whether the seed produced really pays for the food and moisture used.

Selections should then be made with the object of entirely removing suckers. This can best be done by selecting heads from stalks which produce none. In case the crop on which selection is begun does not contain any stalks wholly without suckers, the selection should be made from stalks which have only a single sucker or in which the suckers are very small and appear very late in the season. In this way the tendency to produce them will gradually be overcome. Closer planting in the drills will also have this effect. The combined effect of these two methods will materially reduce the numbers.

Branches.—The stems of all sorghums, like those of corn, are made up of alternate joints, called nodes, and elongated sections of nearly round stem called internodes, meaning literally "between the nodes." The peduncle is the rather long section of the stem which grows from the uppermost node and bears the main head. A leaf arises at each node. The lower part of each leaf is called the sheath and is a collar which tightly incloses the internode for some distance above the joint or node from which it grows. A little bud is borne at every node except the uppermost, which bears the main peduncle instead. These buds lie snugly in a little furrow in the internode, with the leaf sheath wrapping them like an overcoat. When conditions are favorable, these buds develop into branches.

Branches are most likely to be produced when the weather remains warm and moisture is abundant late in the season. The uppermost bud develops first, the young branch forcing its way out at the top of the leaf sheath or by splitting the back of the sheath. It then rapidly elongates, putting out leaves and finally a terminal seed head. It thus becomes a miniature stalk, growing on the parent stalk and exactly like it in all respects except size. Meantime the buds at the successively lower nodes have been making similar growth. If the season is long enough and the moisture sufficiently abundant, all these developing buds will become fruit-bearing stalks. In extreme cases the lateral buds on the oldest or uppermost branches will themselves develop into branches. This compound branching could go on indefinitely if permitted by seasonal conditions.

The heads on these branches are much smaller and less productive than those on the main stalk. They are also much later in maturing. Advertisements which state that a single stalk produces from four to ten large heads are wholly misleading. The branches themselves, arising first from the upper nodes, make the plant top-heavy and likely to lodge.

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The presence of branches interferes with the harvesting of the grain. It often delays the maturing of the main head. Branches also use water that should remain in the ground for the use of the next crop, without making any adequate return. They are therefore wholly objectionable and should be prevented by selection and proper planting wherever they tend to occur.

BETTER METHODS OF PRODUCTION. Only methods of planting and the proper cultivation of the crop will be treated here. Rotations and general tillage to conserve moisture have their influence on crop improvement. In a new country, however, strict rotation systems can not be followed, and the general methods of dry farming need not be given in this paper. The principles are two: (1) Till so as to absorb the rainfall, and (2) till so as to prevent evaporation. This subject has been fully treated elsewhere.*

Proper Stand or Row Space.—The whole question of the proper stand or row space for the different varieties under different conditions of soil and moisture is one of which little is yet known. It is not the plant having the largest head which makes the biggest acre yield, but the plant which can produce the largest head while growing in the smallest possible row space.

The results of four years' experiments at the Amarillo experiment farm, Amarillo, Tex., indicate that in general the kowliangs yield best with a stand of one stalk in each five or six inches of row; the milos and durras with one stalk in each seven or eight inches of row; and the Kafirs with one stalk to each nine or ten inches of row. In all cases the rows are three and one-half feet apart, and as far as possible the seeds are dropped singly in the rows. Under these conditions improved varieties in each of these three distinct groups give approximately the same yields. The Amarillo experiment farm has an elevation of 3600 feet and an average annual rainfall of twenty-two inches, the larger part of which comes during the growing season. Further investigations, continuing the experiments through a longer period of years, may discover that better average yields will be produced at other spacings than those noted above.

It is probable that at other locations better results will be secured at other rates of planting than those given for Amarillo. The rate will vary with different elevations, different amounts of annual rainfall or a different proportion of it during the growing season, and with differences in the character of the soil.

Drills or Hills.—Another important question which has not yet been made the subject of experiment to any extent is the comparative value of planting in drills and in hills. For instance, one stalk every six inches in the row, or two stalks in a hill every foot, or three stalks in hills eighteen inches apart, or four stalks in a hill and the hills two feet apart would all give the same number of stalks per acre. Would they give the same results in bushels of grain per acre? The answer is not known. All the evidence at hand indicates that the advantage is in favor of a

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* See Farmers' Bulletin 256, entitled "Management of Soils to Conserve Moisture," which will be sent free on application to the Secretary of Agriculture, Washington, D. C., or to any member of Congress.

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single stalk in a place. Experiments with corn seem to show that where from three to five kernels are planted in a hill better results are secured when the kernels are scattered a few inches apart instead of being dropped in a bunch.

Aside from the immediate question of yields, however, there are other reasons for preferring planting in drills rather than in hills. These reasons are connected with the production of suckers and pendent heads. Observations indicate that the fewest suckers and pendent heads to the stalk are produced where the stalks stand singly. Whether this be true or not, it is certain that where the stalks stand one in a place it is much more easy to determine whether suckers are produced and to take steps to get rid of them by selection.

Planter Plates.—The difficulty of securing proper rates of planting is partly due to an idea persisting in the minds of growers and partly to lack of suitable plates. When the former is corrected, the latter can be easily obtained. The first sorghums extensively cultivated in this country were the sorgos, which are forage crops and as such are planted thickly. The other leading groups, the milos and Kafirs, were also first regarded as forage plants and sown quite thickly. Corn planters were equipped with "cane" plates which dropped ten to twenty-five seeds in a foot of drill. In this way the idea of thick seeding for sorghums became firmly fixed in the minds of growers.

The value of the milos, Kafirs, and durras as grain producers was only gradually recognized. The necessity of planting thinly where high grain yields were desired was realized even more slowly. Though this necessity is now being seen by the great body of grain-sorghum growers, there is not yet knowledge and agreement as to the proper rates of planting. These vary with different conditions and must be made the subject of extensive experiments. Meantime the manufacturers of planters, though recognizing the demand for different plates, have had little data on which to create a suitable supply.

So far as the size of the seeds is concerned, probably only two sets of plates will be necessary in order to drop a single seed at a time of any variety. The two sets will have the holes of different sizes, and perhaps of slightly different shapes also. Milos and durras have rather large seeds, more or less round in outline. Kafirs and kowliangs have smaller and more nearly oval seeds.

Having these two sets of plates, certain variations in the rate of planting will be necessary in order to space properly the seeds of different varieties in the drill. For instance, the seeds of Kafirs and kowliangs will drop singly through the same hole, but the Kafirs should be planted ten inches apart and the kowliangs only five or six inches. The variation in rate is secured in two ways: (1) By the adjustment on the planter which changes the speed of the plate, and (2) by using plates drilled with different numbers of holes. Where plates with the proper number of holes are not purchasable, blank plates can be secured and drilled by a blacksmith. Care should be taken that the holes are countersunk on the lower side of the plate so that seeds will not become wedged in them.

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Adaptability to Machine Handling.

More than ever is it true that the demand is strong for crops which may be handled readily and profitably by machinery at every stage in their production. This has long been true of the small-grain crops. Corn and cotton are examples, however, of two great staple crops which must still be gathered by hand. However, many and varied efforts are being made to produce machines which will gather the ears of corn and the lint-covered seeds of the cotton.

If the grain sorghums are to become staple crops on a large scale they must be adapted to machine handling. In the early years of the cultivation of milo and Kafir as important crops, there were two methods of harvesting in vogue where seed was desired. The first was to cut the crop, stalk and all, with the corn binder and cure it in the shock. The heads were then cut from the bundles with a knife, saw or hatchet. The second method was to cut the heads by hand in the field. This was done with a knife, and the heads were thrown into a wagon body, like ears of corn. Both these methods are in common use to-day.

HEADERS. Some years ago there was invented a header designed for use in heading Kafir. Though still in use to some extent, it has never been a popular or widely used machine. It is rather heavy, not running upon its own gear, but attached instead to the side of the wagon box. It is heavy and hard to handle, destructive to the wagon bed, and not susceptible to quick and wide adjustments. Moreover, it heads but a single row at a time and is rather expensive, considering all these points. It can not be used on milo because of the large number of pendent heads, or on dwarf milo because of its low growth. In recent years many attempts have been made to invent a satisfactory row header which would be free from the objectionable features mentioned. So far these efforts have not been successful, though one of the machines gives considerable promise.

Since the introduction of dwarf milo it has been found possible to harvest it rapidly and satisfactorily by means of the ordinary grain header. The standard milo and the Kafirs are too tall for easy handling with this machine. A few ingenious farmers have, however, contrived to raise their headers on planks to a point where they will gather these taller crops with a fair degree of satisfaction. One great advantage of the grain header is that it enables the farmer to harvest his small grains and his feeding grains with the same machine. As it cuts a number of rows at a time, the work is done rapidly and a large area is easily handled.

Two facts still prevent the general use of the grain header for these crops, viz., their height, and the presence of pendent heads in some varieties. Here is a problem in selection for the farmer. Dwarf strains of Kafir must be perfected to equal the dwarf milo already so popular. Varieties with erect heads must be had in all milos and durras.

PENDENT HEADS. There are four great groups of grain-producing sorghums now under cultivation in this country. These are milo, durra, Kafir, and kowliang. The first two groups originally had pendent or "goosenecked" heads. In the last two groups the heads are normally erect. The durras are but little grown because of the wasteful shattering

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of the seed, the irritating hairs on the glumes, and the pendent heads. A strain of White durra has been perfected in which 100 per cent of the heads are erect under all conditions. Improvement in the milos has not progressed so far. The percentage of erect heads varies from 50 to 95, depending, perhaps, more upon the character of the season than on the particular strain. This character does not yield readily to selection. It doubtless can be entirely eliminated, however, by long-continued selection.

Pendent heads seem to be the result of deep-seated habit in the plant. Because the largest, heaviest heads are most likely to be pendent, some persons believe that the bending is caused by the weight of the head. This is not true. The peduncle, or stem bearing the head, often begins to turn down as soon as the head comes out of the boot and before it is at all heavy with seed. Strong, vigorous stalks are most likely to produce pendent heads. Enough desirable stalks bearing erect heads can usually be found, however, to allow selections for erectness.

Our experiments show that the planting of these crops rather thickly in drills tends to prevent too great a vigor of growth and therefore checks the production of pendent heads without decreasing the yield. With the same number of plants per acre, those planted in hills appear to produce more pendent heads than those spaced evenly in drills.

Though all heads are not really pendent, the header must be set about as low in order to harvest them as if they were hanging straight downward.

GIVE THE BOYS A CHANCE TO SELECT GRAIN-SORGHUM SEED.

Complaint is commonly made that the children are not interested in the farm and that many of them leave it as soon as possible. Interest can be awakened by giving the boys and girls something definite to do in the way of improving the farm and its products. Once started, they should be encouraged to feel responsible for results. They should also receive a money return, however small, for the improvement resulting from their efforts.

The formation of various boys' and girls' clubs, especially those for the growing of corn, is helping to create interest in the things of the farm. They are real steps in the right direction and should be extended to cover all farm crops, poultry, and live stock. But it is not necessary to await the formation of a neighborhood club in order to interest the boy in selecting better seed. Help him to make selections from the year's crop. Let him prepare it for storing over winter. Set aside a field on which he can plant it the following spring. Plant alongside it some unselected seed. Assist him in comparing the two fields. Encourage him if striking results are not obtained the first year. Give him a fair share of the profit when profit results from his labors. The best result will be the increase of interest and knowledge in the boy.

SUMMARY.

The "grain-sorghum belt," broadly speaking, is the southern half of the Great Plains region, nearly 400 miles wide and 1000 miles long.

It is a region of low rainfall and high evaporation, of varied soils and considerable elevation, with correspondingly shortened seasons. It is suited to become a noted stock-feeding region.

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The grain sorghums, including milos, durras, Kafirs, and kowliangs, are of recent introduction and have become important only within the last twenty years. By their earliness, drought resistance, and adaptability they are especially fitted for growth under plains conditions.

Sorghum grain is largely used for feeding stock on the farms where it is grown. Its feeding value is nearly equal to that of corn. The protein content averages higher than that of corn, the fat and fiber content lower.

Any surplus is readily marketed as whole grain or as chops for feeding purposes.

Sorghum grain is in much demand for poultry food, for which it is admirably suited. Over 25 per cent of the ingredients of prepared poultry foods in the eastern United States is Kafir grain.

It seems probable that the meal can be used as readily as corn meal for human food, and that both the meal and the flour can be used in mixtures with wheat flour if desired.

Kansas and Oklahoma grow annually over 1,250,000 acres. It is probable that an equal area is grown in Texas also.

More than half the Kafir and over 95 per cent of the milo is grown on the dry lands west of the ninety-eighth meridian. In this region the proportionate acreage of grain sorghums to corn is steadily increasing.

In spite of the less favorable conditions under which much of the crop is grown, the average acre value of the grain sorghums in Kansas is higher than that of corn, and in Oklahoma it is 70 per cent as great.

The grain sorghums may be greatly improved through the selection of better varieties and the use of better methods.

Improvement will be chiefly in the direction of (1) drought resistance, (2) earliness, (3) dwarf stature, (4) productiveness, including erect heads and freedom from suckers and branches, and (5) increased machine harvesting.

The drought resistance of the grain sorghums is very important. It is probably a combination of several characters, some actually drought resistant, as controlled transpiration and a strong root system, others only drought evasive, as earliness and dwarfness.

Improvement in earliness is necessary in adapting the crop to regions having a short growing season. Early plants take advantage of early seasonal rainfall and also have lower water requirements.

Milo, White durra and some Brown kowliangs are normally early. Two early strains of Blackhull Kafir have been produced, one tall and one dwarfed.

Dwarf stature lowers the water requirement of the crop and permits heading by machinery. Dwarf varieties are now to be had in all groups.

Better yielding varieties may be produced by selecting for well-shaped, well-filled heads, fully exserted from the boot, and as large as possible in proportion to the size of the stalk.

The value of suckers in the grain-sorghum crops is doubtful. They are often shorter and usually later in maturing. Seed is so cheap and so little is used per acre that only a single stalk from each seed need be required.

Branches are utterly worthless for grain production in proportion to their objectionable features, and should be eliminated.

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Experiments show that under Panhandle conditions kowliangs give best yields with a stand of one stalk to each five or six inches of 3½-foot rows; milos and durras each seven or eight inches, and Kafirs each ten inches. Under different conditions the spacing will need to be varied somewhat.

Better results are probably secured from plants single in the drill than from the same number of plants in hills. Single stalks are also more easily selected and harvested and seem to produce fewer suckers.

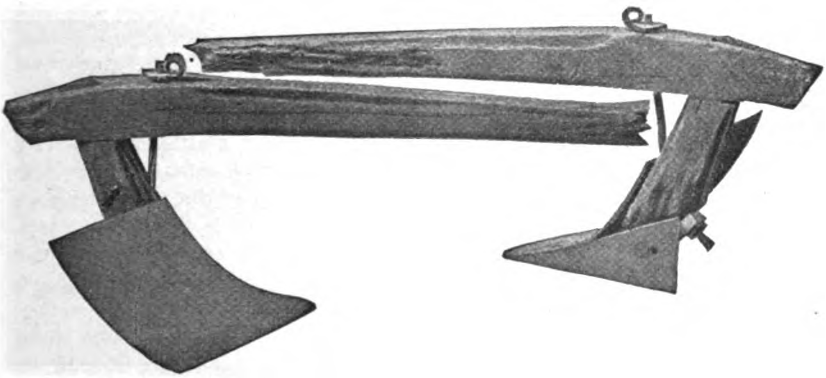
To plant single seeds of the different grain sorghums two sets of plates are needed, with holes of different sizes, one set for milos and durras and one for Kafirs and kowliangs.

To space different varieties properly in the drill, speed adjustments on the planter or plates with different numbers of holes will suffice.

The ordinary grain header harvests low varieties, like dwarf milo, with complete success. The invention of satisfactory row headers or the growing of other dwarf varieties will solve the harvesting problem finally.

Pendent heads are usual in some varieties. They can be slowly eliminated by selection and proper planting.

The boys of the farm should be interested in seed selection to improve farm crops. Give them a chance with the grain sorghums.



The first steel plow, hand made by John Deere in 1837.

THE MAINTENANCE OF SOIL FERTILITY.

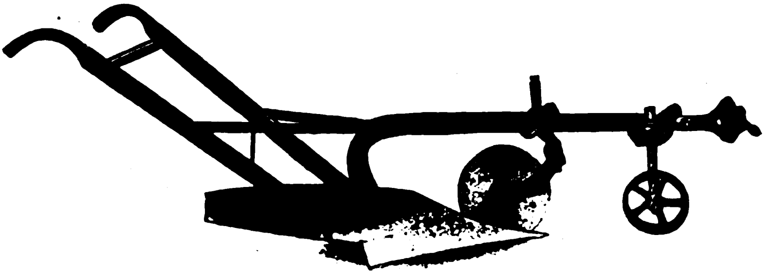
By CHAS. E. THORNE, Director Ohio Agricultural Experiment Station, Wooster, at the Board's Fortieth Annual Meeting.

While it is true that the larger part of the crops grown for food comes directly from the atmosphere, yet it is not less true that in order for our crops to gather this atmospheric food they must be grown in a fertile soil, for the relatively small portion of the plant which the soil furnishes is to it as is the skeleton by which the animal organism is supported. Therefore the maintenance and increase of the fertility of the soil is a problem of transcendent importance, for unless we continue to be able to draw from the soil a constant and increasing supply of the basic constituents of food the time must come when a limit will be set to the increase in population.

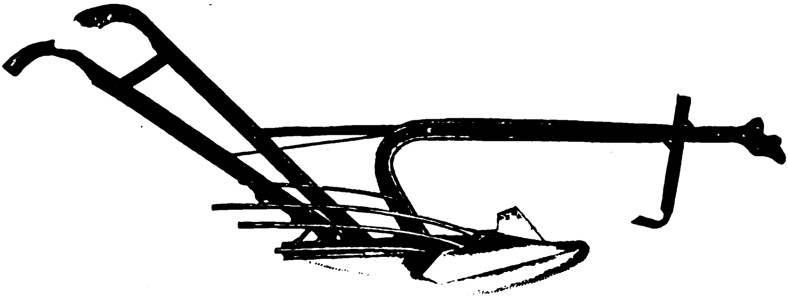
Passing by various factors which contribute to the best utilization of the soil stores of plant food, such as tillage and drainage, factors which are of prime importance but which time will not permit me to discuss, I will take up, first, the question of crop rotation.

CROP ROTATION.

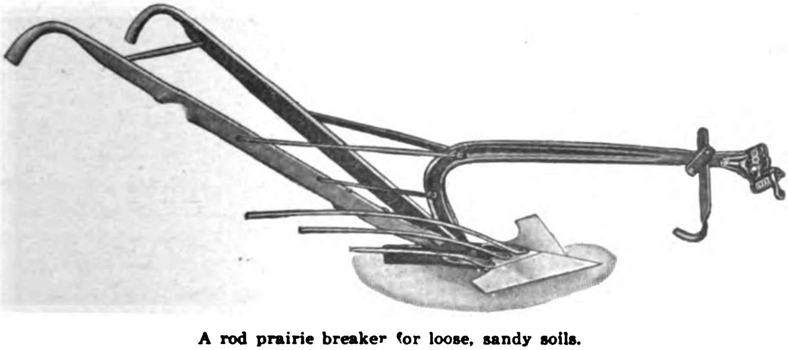
When the pioneer farmer began moving westward from the Atlantic coast he encountered, first in Virginia and Pennsylvania, and later in Ohio and Indiana, tremendous forests covering the ground which it was his first work to remove in order that he might have fields suitable for his tillage. It was an enormous task, this removing of the forest, and there were comparatively few hands to do the work. As a result the first fields were small and they were kept continuously in those crops most needed for food—wheat for man, corn for man and animal. When the crops began to grow smaller the clearing was enlarged and new fields were added, the old fields being abandoned for the time being as worn out. After a time this operation was repeated, and so on from time to time. The farmer who went farther west and discovered the great prairies of Illinois and westward did not have this problem of forest clearing before him and was able, with comparatively little labor, to open the whole area of his land with the plow. But by the time these prairies had been reached the tide of migration had increased to such an extent that it was but a comparatively short period after the first prairie farm was established until practically the entire country was covered with farms. But in the prairies, as in the forest, the habit of continuous cropping has largely prevailed. In some regions the land or the conditions have seemed to be especially suited to certain crops, and these have been grown year after year with little intermission. The great bonanza wheat farms of the Northwest are an example of this kind, the black corn lands of Illinois are another, and in Kansas we find both systems prevailing—corn-growing almost continuously in the western half of the state and wheat after wheat in the geographic center.



A moldboard breaker for tough sod.



A rod prairie breaker for bluestem or bottom-land sod.



A rod prairie breaker for loose, sandy soils.

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But no other fact has been more conclusively established in agriculture than that rotation of crops is absolutely essential to greatest economy in production. All the reasons for this we do not know, but a few are that plants have different feeding habits and consequently one will thrive where another will not, or one will leave food in the soil which another will utilize, while the insect and fungous pests which limit our crops tend to multiply under systems of continuous cropping to a much larger extent that when the crops are rotated. As an illustration of the effect of continuous cropping I would call attention to the experiments of the Illinois experiment station, where corn has grown under conditions of exact measurement of results for a longer period than at any other place in the world. The outcome has been that land which thirty years ago was yielding seventy bushels of corn to the acre has fallen so that during the last three years of the thirty-year period the average yield was twenty-seven bushels, whereas in so simple and unscientific a rotation as that of alternating corn with oats, year about, the yield for the last three years was forty-six bushels, and when corn was rotated with oats and clover the yield was fifty-eight bushels.

CROP YIELDS DIMINISHING UNDER CONTINUOUS CULTURE.

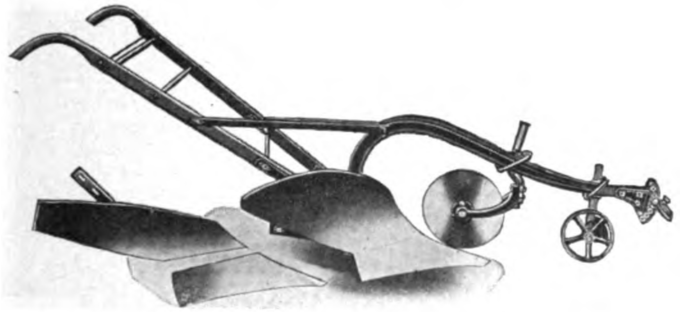
Now I am aware that farmers in the rich valleys of Virginia, or in the similar valleys of Ohio—the Muskingum, Scioto, Miami—claim that they are growing as large crops to-day as they ever did, although they are in many cases practicing the continuous cropping of corn upon the same land year after year; but Ohio has kept statistics of her crop production for sixty years past—these statistics being carefully collected by the township assessors each year—and while, of course, they can not be absolutely accurate, since they must largely be mere estimates, yet there can not be any question that, relatively speaking, they are a trustworthy guide to the general outcome of agriculture in the state, and these statistics show that in these rich valleys so admirably adapted to the culture of corn the yield of that crop was smaller during the ten years from 1880 to 1889, inclusive, than during the similar period from 1850 to 1859. The falling off in some counties amounted to ten bushels or more. The history of wheat culture in the Red River valley is another confirmation of this same principle, where the yield has gone down to a point far below the earlier yields, as stated by Director Worst of the North Dakota experiment station. Kansas statistics also furnish a valuable lesson on this point. These statistics have been gathered since 1860, and from the state

TABLE NO. 2.—*Kansas crops. Average yield per acre by ten-year periods.*

PERIODS.	Average yield per acre.		
	Corn, bus.	Oats, bus.	Wheat, bus.
1860–1869	36 15	33 50	17 06
1870–1879	36 71	32 21	14 51
1880–1889	29 79	33.29	14 32
1890–1899	20 84	21 62	10 56
1900–1909	21.78	22 77	13.16

averages I have compiled the outcome which is shown in table 2. Note the tremendous falling off in the yield of corn during this period, and also that the yield of wheat is on the down grade, notwithstanding the great extension of wheat culture through the counties of the middle of the state, many of which are growing annually more than 100,000 acres of wheat each year.

I do not forget that, with respect to corn especially, a part of this retrograde movement in yield per acre is due to the extension of the agricultural area into the region in which the rainfall is deficient. But let us take two of the oldest settled counties in the state, two of the most fortunately located counties, Douglas and Johnson, lying at the eastern end of the state, and we find that their late yields of corn, while higher than the yields for the average of the state, are still below what the state was yielding forty years ago, though the wheat yields are somewhat higher. Unfortunately, I am not able to present separate statistics for these counties for the earlier years, but in fact during these early years practically all of the agriculture of Kansas was in the eastern end of the state, so that the comparison is undoubtedly a fair one.



A combination breaker and old ground plow.

Wherever we go in this rich, new land of ours we find farmers who are working on the principle that the soil is inexhaustible and who believe that they may go on indefinitely practicing a system of agriculture which all past history has shown to be ruinous; but as the wave of migration has moved westward it has left behind it an area of wasted resources, of diminished production, with a soil more difficult to cultivate and less responsive to the labor bestowed on it. It is a difficult task to persuade the farmer on virgin soil that his methods are unwise. The change in productiveness is so gradual that he does not realize that it is going on, just as those farmers in the Scioto and Miami valleys who have claimed that they are raising as large crops as ever have been shown to be altogether wrong by the logic of statistics, but the changes took place so gradually that they were not able to see them.

THE ROLE OF PHOSPHORUS IN FERTILITY MAINTENANCE.

Let us now consider briefly some of the chemical principles underlying the maintenance of fertility. The modern chemist has separated our soils and our crops into their ultimate elements, and he tells us that only about

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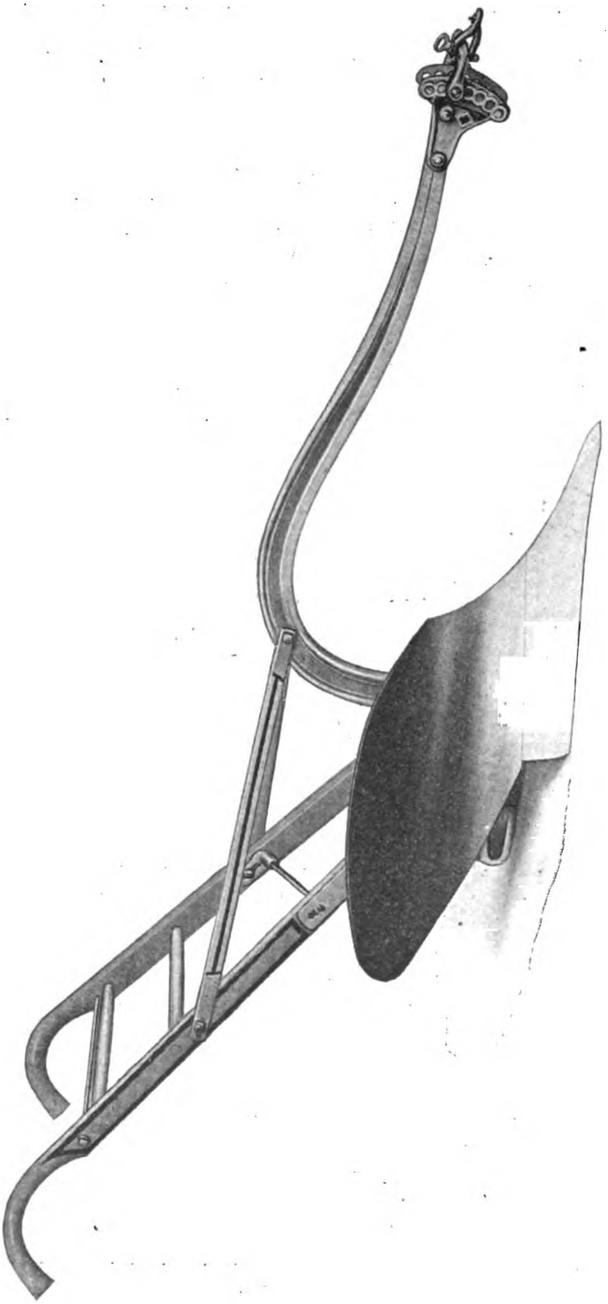

A high-grade steel plow, model of 1912.

eight or ten of these elements are common to both soil and crop. He assumes that these common elements are essential to the production of the crop and he has proved his assumption to be correct by elaborate methods. He has also shown that of these eight or ten elements only three or four require any care on our part for the maintenance of their supply in the soil. One of these three or four is the element phosphorus, an element which constitutes a large part of our bony framework, and which is so essential to the constitution and working of our nervous organism that the saying has gone forth, "Without phosphorus no thought."

The chemist has shown us that in the maturing of our cereal crops about three-fourths of the total phosphorus of the plant is transferred to the grain, while about the same proportion of the total potassium—which is another of the elements which require our care—remains in the straw or stalk. The grains are our food, either directly or after having been transformed into animal tissue, and the animal, like man, must have material out of which to build his bony framework and the nerves which are to it as the electric wires which transmit power from dynamo to motor. It follows, therefore, that whether we are growing wheat for our own consumption or growing corn and oats to feed to our live stock, there is a steady and constant drain of this element phosphorus from the soil, a very small proportion of which is ever returned. More than half of our people now live in the cities, and the sewage of our cities is altogether lost. The wheat not consumed at home is shipped across the Atlantic; the animals produced are chiefly shipped off the farm, carrying with them the phosphorus they have transformed into their tissues. If our product be milk the same story must be told, for that in one way or another is chiefly shipped away from the farm, or if not, the management is such that what fertilizing elements it may contain are lost. From this it is easy to see that unless the soil be very freely stored with phosphorus the time must come, sooner or later, when it will begin to show a deficiency in this element. Now we have in most soils in their original condition a considerable quantity of this element. It is not unusual to find 1000 pounds of phosphorus in the upper seven inches of an acre of moderately good soil, but in order that the crop may grow it is necessary that its mineral food be dissolved in water, for the plant eats only by drinking. Now if these mineral elements exist in the soil in such condition as to be soluble, like common salt, for example, we see at once that very soon in the humid regions they would be washed out of the soil and carried away, and this is, in fact, why the sea is salt. It is because the minerals of the soil have been dissolved out and carried down to the sea throughout the illimitable ages of the past, a period so great that the human mind can not comprehend its duration. But the process which has been going on through all these ages is still in operation, and when the soil constituent becomes soluble it must be utilized if it is not to be lost. Therefore we find that the mineral food of the plant exists in the soil in such condition that it is only brought into solution each season in quantities sufficient to nourish the plants growing upon the surface. In a virgin soil this quantity may be sufficient to produce the maximum growth of which the plant is capable. Thus I saw in the Kaw valley, forty years ago, a crop

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of wheat which made forty or fifty bushels per acre growing on almost virgin soil. But the time very soon comes when this readily accessible source of fertility is exhausted, and the land yields up its plant food more and more slowly year by year.

The first sign of this deterioration in yield is likely to be seen in more frequent crop failures. A dry season affects the crop more than it did formerly; insects cause greater damage than they did before. Meanwhile there will be years when the crops will be as large as ever they were. That is, during the years of drought or insect depredations the forces which bring mineral elements into solution have been going forward, and when there comes a year of abundant rainfall there is material ready for a large crop; but the lean years become more and more frequent, and the fat years more and more infrequent, and thus the average goes down.

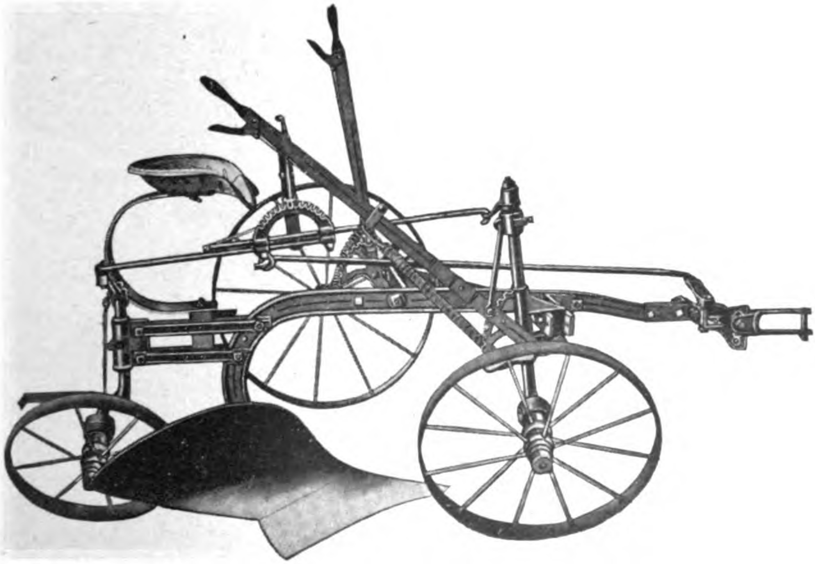
To show the effect of phosphorus as compared with other elements in the restoration of a worn-out soil, I have prepared table 3, which gives the unfertilized yield of wheat in a number of long-time experiments, and the increase obtained on that yield by the use of different fertilizing elements. The first of these gives the results attained by the Pennsylvania experiment station at State College, where the longest continued experiment in the growing of crops in systematic rotation that has been made in this country is now progressing. It is a four-year rotation of corn, oats, wheat and clover, each crop being grown every season. I give only the figures for the wheat crop, as that is the crop which responds most promptly to fertilizers and therefore shows the relative effect more plainly.

TABLE NO. 3.—*Effect of fertilization on wheat grown in rotation.*

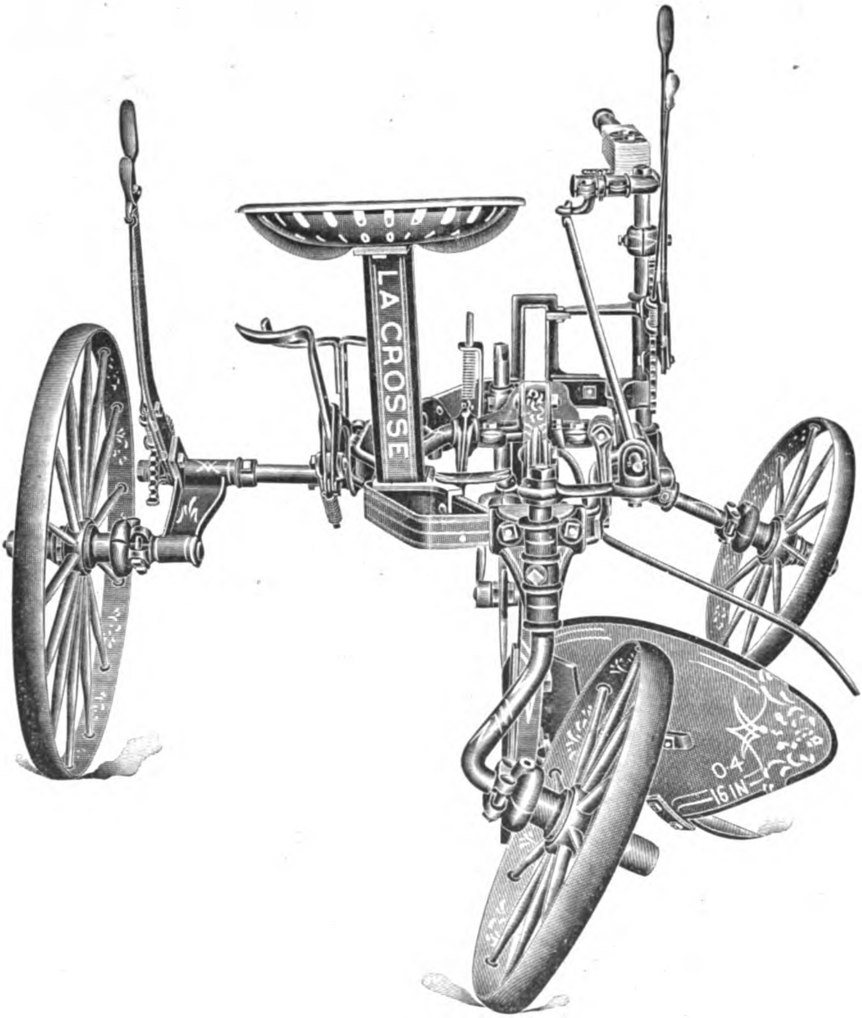
STATION AND TEST.	Increase of wheat per acre from—				Av. unfert. yield.
	Phosphorus.	Phos. and potassium.	Phos., potass. and nitrogen.	Potassium and nitrogen.	
Pennsylvania:	*Bus.*	*Bus.*	*Bus.*	*Bus.*	*Bus.*
Cereal rotation, 25-year average..	2.3	4.9	9.3	0.1	13.6
Ohio—Wooster:					
Cereal rotation, 17 years	8.0	9.1	16.3	2.8	11.0
Potato rotation, 16 years..........	5.8	8.0	9.0	5.1	27.1
Strongsville:					
Cereal rotation, 14 years..........	7.0	8.3	10.1	1.6	7.6
Carpenter:					
Cereal rotation, 6 years...........	4.7	6.4	9.8	2.6	11.5
Germantown:					
Cereal rotation, 6 years...........	4.6	6.4	8.7	1.1	9.9
Tobacco rotation, 7 years.........	6.6	9.3	11.4	5.8	11.1

The next experiments are several made by the Ohio experiment station on its main farm at Wooster and its test farms at Strongsville, Germantown and Carpenter, these test farms being from forty to two hundred miles distant from the main farm and on different soil types of the state. The table shows that in every case the addition of phosphorus has produced a marked increase in the yield of grain. When potassium has been added to the phosphorus a still further increase has been produced, and when nitrogen has been added to the phosphorus and potassium a third step upward is seen. To show, however, the leading position which phosphorus takes in producing this increase I have added a fourth column, giving the increase produced by nitrogen and potassium when used in the absence of phosphorus. This brings out strikingly the very slight influence these elements have had when phosphorus was omitted, yet when we compare the first three columns we see that the nitrogen and potassium have been by no means unimportant factors in producing increase; in other words, our system of agriculture, in which cereals are the main articles of produce, is such as to remove from the soil this element, phosphorus, in larger relative degree than any other element, and the first sign of failure in the soil's pristine fertility is to be seen in the response which crops, and the wheat crop especially, make to the addition of this element in available form.

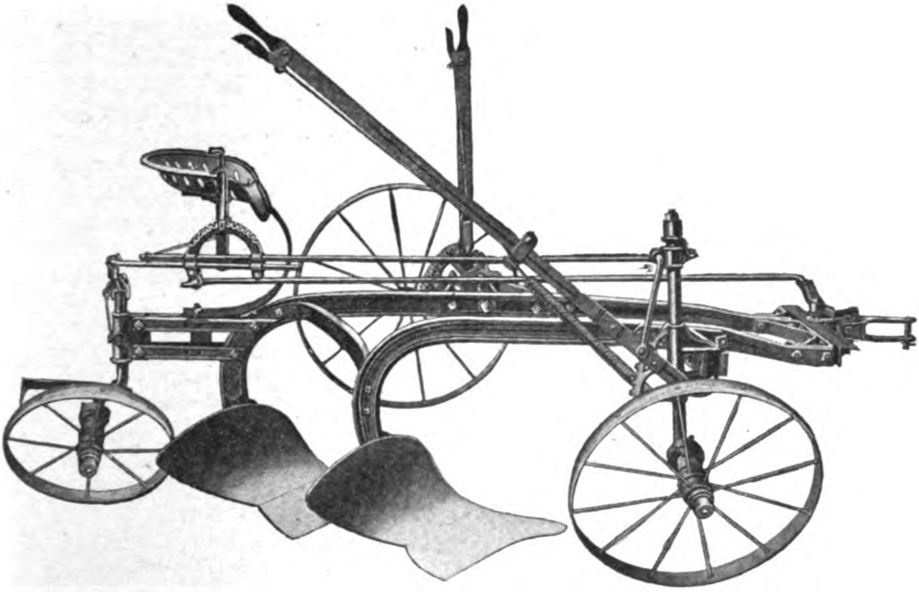
This deficiency in phosphorus may occur before we would expect it, as shown by the wheat grown in the potato rotation at Wooster. Half of the land on which this experiment is located was cleared from the forest for the purpose of the experiment; the other half had been kept in comparatively good condition, so that the average unfertilized yield of wheat for the sixteen years of the test has been twenty-seven bushels per acre, or almost double the average yield of the state for that period; yet on this rich land the addition of only twenty pounds of phosphorus per acre every three years, carried in 320 pounds of acid phosphate, has increased the yield by nearly six bushels per acre. In this case the woodland had been pastured for many years before clearing, and when cleared most of the wood was removed from the land, carrying with it the ash elements.



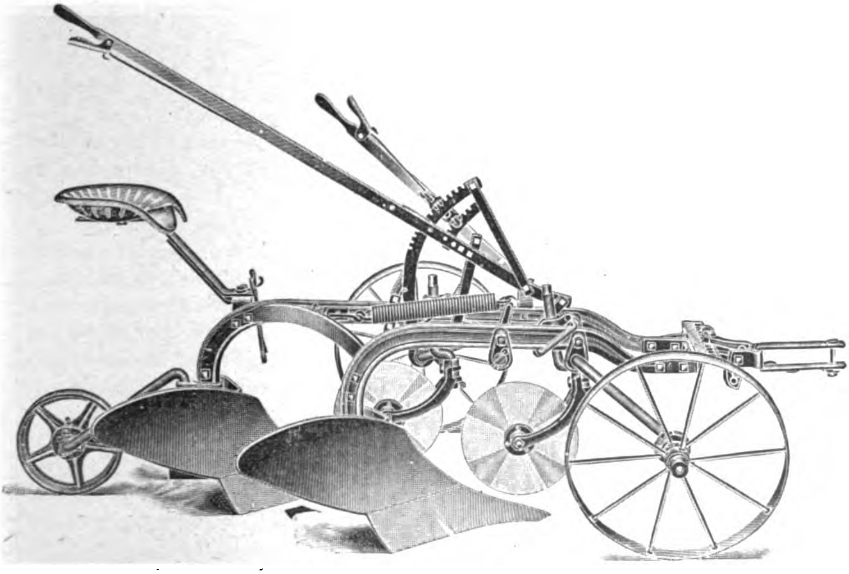
A frameless sulky plow.



An adjustable sulky plow. The frame is always level.



A stag gang plow—all steel.



A light gang, showing rear wheel and seat attachment.

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I do not forget that these experiments are of little interest to the practical farmer unless their indications can be followed by him with profit; unless they mean a larger net income when their lessons are applied to the actual work of the farm. This point I will discuss more fully farther on, only stopping here to say that in every case where phosphorus has been used in quantities not exceeding an annual application of ten to fifteen pounds per acre, carried in acid phosphate, basic slag or steamed bone meal, it has been paid for several times over in the increase of crop, and that it has also been profitable to add potassium in about the same quantity per acre, even on soils already containing several tons of this element in the upper seven inches.

THE VALUE OF MANURE.

Probably no farmers in this country have won more honorable reputation as thorough-going farmers than the Pennsylvania Germans; a sturdy, honest class of people, who have spread over a large part of Pennsylvania, and much of Ohio and Indiana. Wherever they have gone there has been more than the average care in the saving of barnyard manure. The Pennsylvania farmer believed that this was the only thing necessary, unless it be lime, for the complete maintenance of the fertility of the soil. These people were the original settlers of Wayne county, Ohio, in which the experiment station is now located. They brought to that county their habits of thrift and thoroughgoing agriculture, and Wayne county was noted a quarter of a century ago for the finest farms and farm improvements of any county in the state. The experiment station began work in this county eighteen years ago, laying out an extensive series of experiments with fertilizers and manures. It was soon discovered that phosphorus was having a marked effect upon the crops, and that the effect from manure was disappointingly small. We were following the prevailing practice of letting the manure lie in the open barnyard until ready for use and then applying it to corn or to wheat. Stopping to reason upon the cause for the unsatisfactory results we were getting, we saw that the system of agriculture which had prevailed in this county had been such as to exhaust the supply of phosphorus in the soil, for from its first settlement Wayne county had been a large producer of wheat, producing far more than its people could consume. A canal passing near by, and later a system of railroads crossing the county, furnished opportunities for transportation and sale of its produce, and wheat became the cash crop of the county, occupying a larger area than any other crop grown. As I have stated, however, the Pennsylvania farmer was also a keeper of live stock for the production of manure, and during the first half century of agriculture in the county live stock production was a conspicuous feature of its agriculture. Before the advent of the railroad cattle were driven across the mountains to Philadelphia. These cattle, as I have already stated, were carrying away a steady stream of phosphorus, and the wheat was carrying away another. It is evident that growing animals must build up in their framework a large proportion of the phosphorus of their food, and hence the manure produced must be relatively deficient in this element. We therefore started, in 1897, a series of experiments in which we endeavored to learn the

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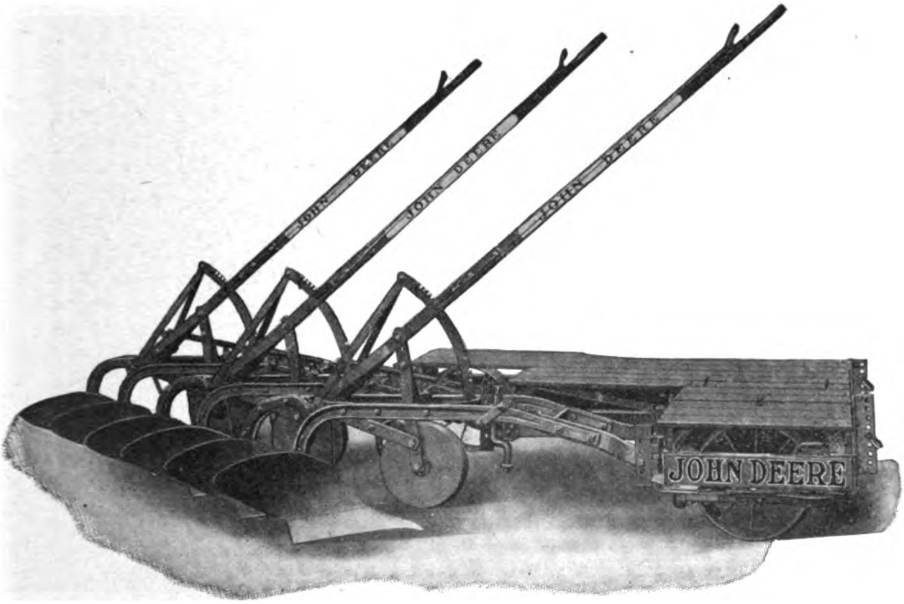
effect on manure of exposing it in open barnyards; also the possible effect of reënforcing the manure with phosphorus. The outcome of that test I put before you in table 4, from which you will see that the manure taken directly from the stable to the field has produced a very much larger increase than that which was allowed to lie in the barnyard for three or four months before going to the field, and also that the manure which has been reënforced with phosphatic materials has produced a much greater crop than that which has not been so reënforced. We have learned from this test that manure is not the complete fertilizer which the farmer formerly supposed it to be, and our reasoning shows us that it can not be such a fertilizer, because of necessity it must to a greater or less extent be deficient in this element, phosphorus.



A Little engine plow equipped with six bottoms.

Let us now consider the financial aspects of this work: In the last table the value of the increase produced by a ton of manure has been computed on the basis of 40 cents per bushel for corn, 80 cents for wheat and $6 per ton for hay. On this basis the ton of untreated manure has increased the crop by nearly two dollars after it had lain in the barnyard until a considerable part of its value had been leached out by the rain or liberated as ammonia gas by fermentation, and by two dollars and a half when taken directly from the stable to the field; while, when the manure has been reënforced by materials carrying phosphorus the value of the increase from a ton of yard manure has risen to three dollars, and of that from a ton of fresh manure to three dollars and a half, after paying the cost of treatment; that treatment consisting simply in dusting the stable floor or the manure with acid phosphate or with the finely

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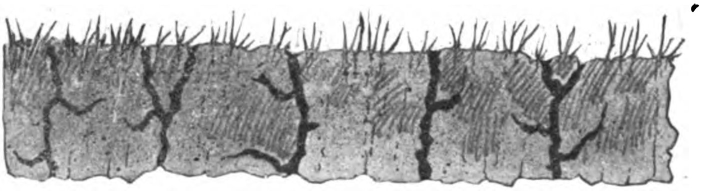
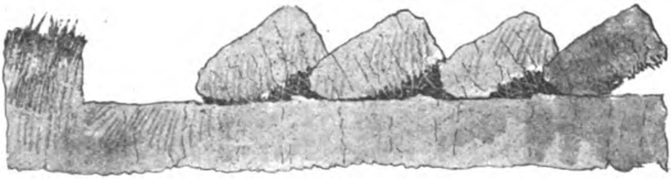
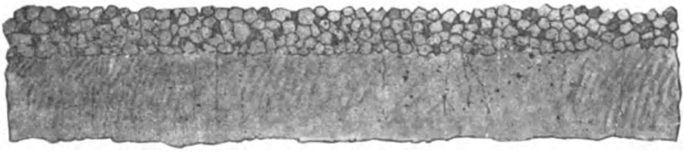


Evaporation cracks in soil layer.

Sun-baked soil—needs disking before plowing.



Land plowed without disking—the wrong way.



Land disked ready for plowing.

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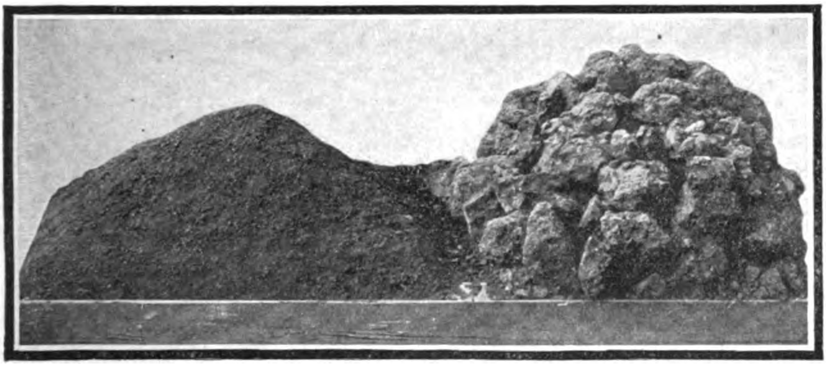
Disked and plowed—the right way—with good subsoil contact.



Two extremes in seed-bed making.

ground phosphatic rock from which acid phosphate is made, using the material at the rate of one pound per thousand-pound animal per day. It will be seen that at these conservative valuations for produce the ton of fresh manure reënforced with a carrier of phosphorus has given a net return of 75 per cent greater than that recovered from a ton of manure from the same animals after three or four months' exposure in an Ohio barnyard.

ROTATION NOT SUFFICIENT.

Even this rotation with clover one year in three, you will see, has not maintained the yield at the original level, thus showing that something more than mere rotation has been required. This point will be taken up

TABLE I.—*Ohio Experiment Station—Continuous vs. Rotative Cropping—Bushels per acre by periods.*

TREATMENT.		Untreated.			Manured.		
		1894-1898.	1899-1903.	1904-1910.	1894-1898.	1899-1903.	1904-1910.
Corn,	Continuous,	26.3	16.8	10.2	43.1	40.1	32.0
	Rotative...	31.9	30.8	25.8	40.7	49.5	56.0
Oats,	Continuous,	28.2	20.4	22.2	34.8	36.8	42.8
	Rotative...	30.9	28.3	34.9	36.9	40.4	47.5
Wheat	Continuous,	10.1	8.4	6.7	15.8	18.5	20.1
	Rotative...	9.3	8.6	13.9	12.6	19.0	30.6

ANNUAL VALUE OF CROP PER ACRE. LAST SEVEN YEARS.

Treatment.			Total value.	Cost of treatment.	Net value.
Continuous,	Corn	Untreated	$4 08	....	$4 08
		Fertilized	14 28	$8 60	5 68
		Manured	12 80	2 50	10 30
	Oats	Untreated	6 66	....	6 66
		Fertilized	13 02	8 60	4 42
		Manured	12 84	2 50	10 34
	Wheat	Untreated	5 36	....	5 36
		Fertilized	15 60	8 60	7 00
		Manured	16 08	2 50	13 58
Rotative...	All crops	Untreated	10 38	....	10 38
		Fertilized	18 70	4 70	14 00
		Manured	19 73	1 60	18 13

later on. At the Ohio station a similar experiment has been in progress for a shorter time with corn, oats and wheat, one acre in each crop having been grown continuously for seventeen years. The results of this test are given in table I, which shows that for the first five years of this test the wheat and oats grown continuously yielded as much as those grown in rotation, but that the corn, even from the start, showed a falling off in yield, and this falling off has continued with all three crops during the succeeding periods until at the close the untreated yield of corn has diminished to a little more than one-third its original yield, that of oats has lost about thirty per cent of its original yield and that of wheat about the same. Even fertilizers or manure have failed to maintain the yields of corn, although both were used in liberal quantity. The oats and wheat, however, have been held to a level point by the use of fertilizers, and slightly increased by the use of manure.

Let us now study the rotated crops during the same period: Taking the unfertilized yields, we find that the corn has fallen off during the last period although maintained at a level previous to that. The oats and wheat, however, show larger yields during the last period than during the preceding ones, due to favorable seasons, and in fact the falling off in the yield of corn has been due not so much to deterioriation in the soil as to insect ravages and climatic changes. When, however, these crops have been manured or fertilized in the rotative cropping you will see that in every case there has been a large and steady increase throughout the three periods of the experiment.

Taking now the last column, giving the average for the last seven years, and contrasting continuously grown with rotated crops, you will observe that the rotated corn has produced two and one-half times as much as the continuous corn, the rotated oats more than fifty per cent more, and the rotated wheat a little more than twice as much. With manures or fertilizers the difference has not been so great, but even in this case there has been a large difference in favor of the rotated crops. One point, however, has not been brought out here, and that is that the continuous crops have had larger applications of manure or fertilizers

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than the rotated crops. This point is more definitely shown in the figures giving the net value of the total crops for these periods, as given in the final column of the table, and which show very much greater net gain from the rotated crops in every case than from those grown continuously.

TABLE NO. 4.—*Maintenance of fertility with manure and chemicals. The value of barnyard manure: 14-year average.*

TREATMENT.	Yield per acre.			Net gain.	
	Corn, bushels.	Wheat, bushels.	Hay, tons.	Annual per acre.	Manure per ton.
None	31.6	11.5	1.22	......	......
Untreated yard manure	48.8	20.1	1.53	$5.21	$1.96
Untreated fresh manure	56.7	21.6	1.88	6.70	2.51
Phosphated yard manure	58.2	25.7	2.06	8.17	3.06
Phosphated fresh manure	62.1	26.8	2.39	9.32	3.49

Effect of chemical fertilizers. Treatment and 17-year yield per acre.

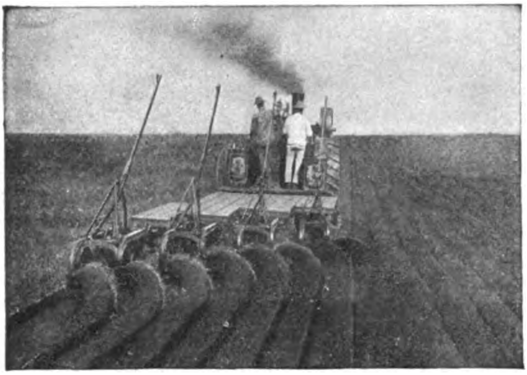
CROP.	None.	Phosphorus.	Phos. and potassium.	Phos., potass. and nitrogen.	Potass. and nitrogen.
Corn, bushels	29.1	36.9	42.5	45.8	35.0
Oats, bushels	31.8	40.8	43.5	50.0	37.7
Wheat, bushels	11.0	19.0	20.2	27.4	13.9
Clover, tons	.98	1.31	1.50	1.70	1.20
Timothy, tons	1.25	1.78	1.67	1.83	1.50
Annual value of increase		$2.86	$4.11	$6.58	$1.78
Annual cost of treatment		.52	1.30	4.70	4.18
Annual net gain or loss		2.34	2.81	1.88	2.40

FARMING WITH CHEMICALS.

But we have in Ohio many farmers who claim that they can not make enough manure to maintain the fertility of their fields, and we are now paying out a million dollars a year in the purchase of chemical fertilizers which are generally used as substitutes for manure. In the lower part of this table is given the outcome of seventeen years' use of such fertilizers on crops grown in a five-year rotation of corn, oats, wheat, clover and timothy, one year each, each crop being grown every season. In this experiment the same quantity of acid phosphate used in reënforcing the manure in the experiment first described is divided between the corn, oats and wheat—80 pounds each on corn and oats and 160 pounds on wheat—with the result of an annual average increase in the five crops to the value of $2.86, using the same valuations above given for corn, wheat and hay, and rating oats at 30 cents per bushel.

The cost of this phosphate, at retail, has been 52 cents, leaving a net gain of $2.34 per acre, whereas the same quantity of phosphate, added to eight tons of fresh manure, has increased the acre value of produce by the difference between $6.70 and $9.32, or $2.62.

When the phosphorus has been reënforced with potassium the total value of the yield is increased to $4.11 and the net value to $2.81, after deducting the cost of the much more expensive fertilizer; but when the fertilizer is further reënforced by the addition of nitrogen carried in the nitrate of soda, the cost of the fertilizer is so greatly increased that, at the prices for produce used in computing this table the margin of profit is reduced. It should be stated, however, that at the prices which have recently been current in Ohio, the situation is so altered that this treatment yields a larger net gain than those from which the nitrogen is omitted.



An engine plow gang doing good work at turning tame sod.

But the point of general application here is that on this rundown soil it has been necessary to use phosphorus, potassium and nitrogen, all three, before the full crop could be obtained. The only question is how to obtain a cheaper supply of nitrogen than that carried in chemical fertilizers.

Let us now compare the yields on this land, treated with the complete chemical fertilizer, with those given by the land which receives also a complete fertilizer in the form of phosphated fresh manure, and we find the following average yields:

Corn—45.8 bushels from chemicals.
62.1 bushels from manure.
Wheat—27.4 bushels from chemicals.
26.8 bushels from manure.
Clover—1.70 tons from chemicals.
2.06 tons from manure.

Annual value of increase:
$6.58 from chemicals.
9.52 from manure.
Cost of treatment: $4.70 for chemicals.
2⅔ tons of manure.

The manure has been used at the rate of eight tons per acre, applied to the corn crop every third year, thus amounting to the equivalent of 2⅔ tons annually, and this quantity of manure has produced increase

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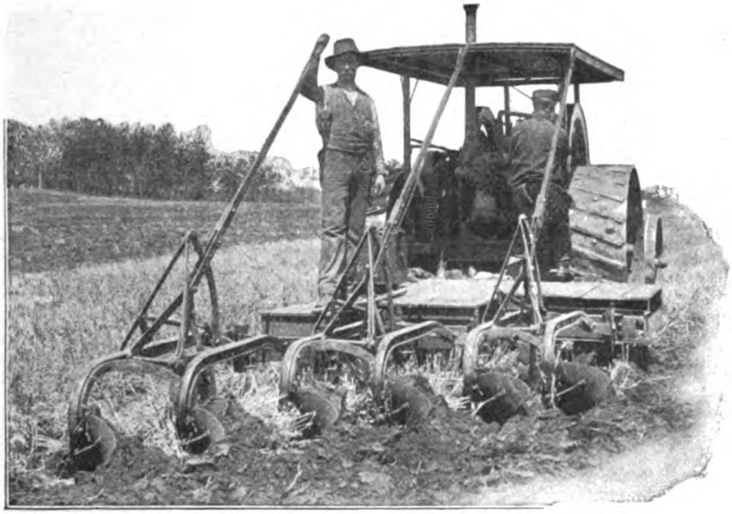
of crop greater by more than 40 per cent than that produced by chemicals costing $4.70. It therefore seems legitimate to claim for a ton of fresh manure, produced by fattening cattle, a potential crop-producing value equal to at least two dollars' worth of the most effective fertilizing chemicals, for the soil on which these experiments are being conducted, saying nothing about the more permanent effect which, as long experience has shown, may be expected from manure.



A six-plow gáng doing business.

We have, therefore, in this product of the barnyard a source of nitrogen which, properly used, will enable the farmer who has the ability to make use of it in connection with the growing of clover, alfalfa, soy beans and cowpeas to dispense with the purchase of any fertilizing material except phosphorus and, to a smaller extent, potassium. The supply of phosphorus must be maintained by additions from outside the farm, and also that of potassium when this element becomes deficient.

The experiments which I have been describing have been made on small plots, one-tenth or one-sixteenth acre in size, and as these plots have been visited by Ohio farmers they have raised the question whether such results are possible of attainment on larger areas. There belongs to the station a tract of forty acres which has been worked in four ten-acre fields on which corn, oats, wheat and clover have been grown in rotation since 1894, each crop being grown every season. For the first ten years the only treatment this land received was a top-dressing of barnyard manure applied in August at the rate of about ten tons per acre for the land being prepared for wheat, and under this treatment the average yields per acre for the ten years were 48 bushels of corn, 50 bushels of oats, 20 bushels of wheat and about two and three-quarters tons of hay.

A LESSON IN PLOWING

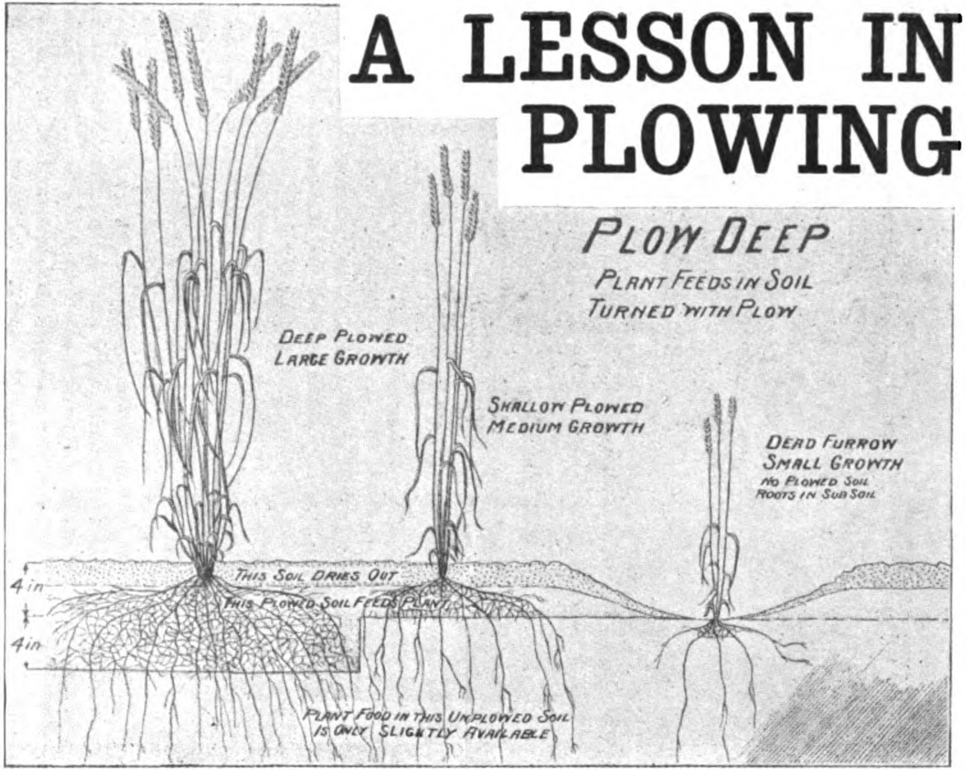


TABLE NO. 5.—*The possibilities of an Ohio farm.*

Four 10-acre fields rotated in corn, oats, wheat and clover since 1894: First ten years, ten tons open-yard manure on wheat; nothing on the other crops. Last seven years:

On corn, 10 tons phosphated manure, cost floats	$1 60
On corn, 1 ton lime or 2 tons limestone dust	6 00
On wheat, 400 pounds 4-16-5 fertilizer*	6 40
Total cost, except manure, for one rotation	$14 00

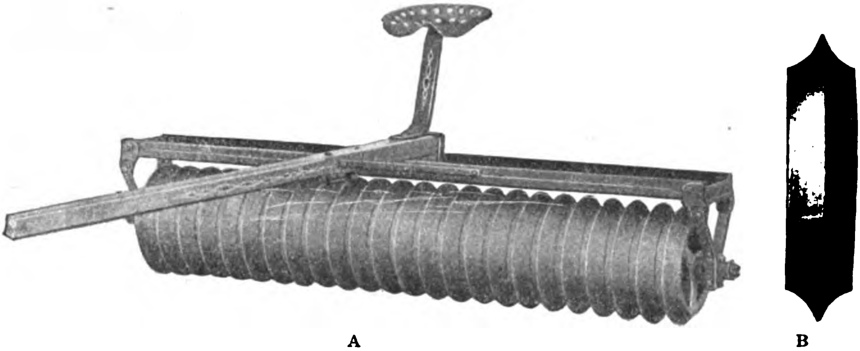
AVERAGE YIELD PER ACRE.	Corn, bus.	Oats, bus.	Wheat, bus.	Hay, tons.
First ten years	48	52	20	2.7
Last seven years	73	56	37	3.7
Increase, lime and fertilizer	25	4	17	1.0
Probable unmanured yield	26	35	14	1.0
Gain for manure and fertilizer	47	21	23	2.7

Value, total gain, $64. Cost of treatment, $14. Net gain, $50.

* MATERIALS.	Lbs.	Cost.	Ammonia, lbs.	Phos. acid, lbs.	Potash, lbs.
Steamed bone meal	200	$2 80	5	50	......
Acid phosphate	100	80	......	14	......
Muriate of potash	40	1 00	......	......	20
Nitrate of soda	60	1 80	11	......	......
Totals	400	$6 40	16	64	20
Per cent	....	....	4	16	5

In view of the results obtained in the substitution of fresh phosphated manure for yard manure; of the relatively greater effect of manure on corn and of chemical fertilizers on wheat; and of the fact, which another series of experiments had brought out, that the soil of this region has become so deficient in lime that this deficiency must be made good before either manure or fertilizer can have their full effect, we changed our method of treatment some years ago, and since then instead of allowing the manure to lie in the open barnyard we first treat it with phosphate and then keep it under cover until the seed crop of clover is taken off, when we spread it over the clover stubble at the same rate formerly used, and plow it under the following spring for corn, after which we apply a ton of burnt lime or two tons of ground limestone per acre. We leave the oats crop untreated, but the wheat crop receives about four hundred pounds per acre of a high grade, complete fertilizer. The result of this change of plan has been to increase the corn crop from 48 to 74 bushels per acre; the oats from 52 to 56 bushels; the wheat from 20 to 37 bushels, and the hay from 2¾ to 3¾ tons—yields on ten-acre fields much larger than those obtained on the small plots, and larger by 26 bushels of corn, 4 bushels of oats, 17 bushels of wheat and one ton of hay than those previously harvested on the same land.

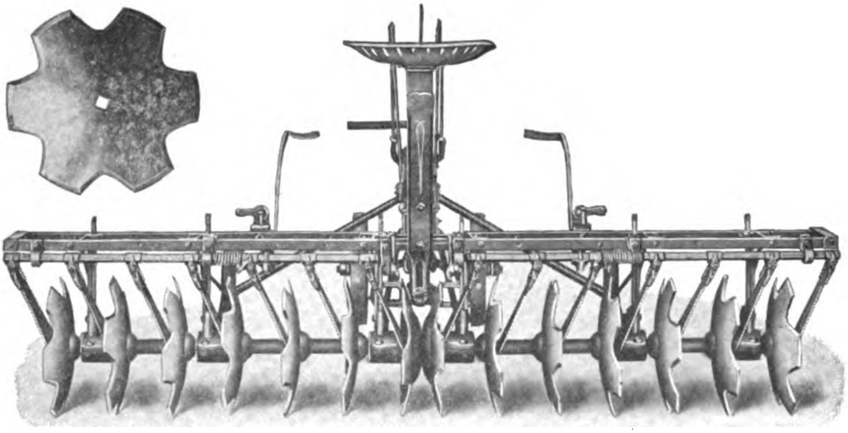
This increase has been obtained at a cost per acre of about 400 pounds of raw phosphate rock used on the manure, 400 pounds of chemical fertilizer and a ton of lime, the whole amounting to $14 per acre for



A.—Combination pulverizer, sub-surface packer and clod crusher.
B.—Front view of single wheel or section.

each four-year rotation, or $3.50 annually, while the increase at the prices I have been quoting would have a total value of $32 for each rotation or $8 annually, leaving a net annual gain of $4.50 per acre, a rate of gain more than 50 per cent greater than that shown in the small-plot tests.

It will be observed that the manure has not been charged against the crop in the calculation above. No unmanured land has been left in this field test, but we may safely assume that if the land had been left without manure the crop yields would have fallen to about the level of those on the adjoining land on which the plot experiments are being conducted, land of the same character and geological history. These yields have been for the last seven years, 26 bushels of corn, 35 bushels of oats, 14 bushels of wheat and a ton of hay, having an annual acre value of $12, as against an annual value of nearly $29 for the crops grown under the treatment described, a difference of $17. Deducting the cost of lime



A cutaway disk harrow with oscillating scraper.

and chemicals—$3.50 per acre annually—we have left a net difference of more than $13 per acre annually, or more than $5 for each ton of manure.

THE PRODUCTION OF MANURE.

This scheme of management requires the production of 100 tons of manure annually for every forty acres in crops. Feeding experiments made by various experiment stations have shown that in a feeding period of 200 days 400 pounds of increase in live weight may be made by a steer starting at an initial weight of 800 to 1000 pounds, and that in producing this increase the steer will consume, in a properly balanced ration, a total of about 10 pounds of actual dry substance to each pound of increase. In addition to these data the experiments of the Ohio station have shown that while making this increase the steer will produce 5 tons of manure, which may all be saved by feeding on a cemented floor. Twenty steers, therefore, would produce the 100 tons of manure required to cover a ten-acre field at the rate of 10 tons per acre, and these 20 steers would consume 80,000 pounds of dry substance. This amount of dry substance, in suitable proportions of grain and roughage, might be secured from the corn and oat crops and half the hay, and the product, under judicious management, would have on the average a greater value than would be realized by selling the feeds, with the manure as an offset to the labor of feeding, interest on investment, etc.

It may be that we shall find as this work goes on that 10 tons of manure to the acre, reënforced by the fertilizing materials employed in this test, will not maintain the yield permanently at the high level it has now attained. In fact, I expect that the time will come when the soil's hunger for phosphorus will be satisfied and the great store of potassium now on hand will become so lowered that it may be better to use less of the former element and more of the latter. Moreover, the nitrogen content of the crops taken off is far greater than that of the manure and fertilizers returned, and we do not yet know to what extent clover is able to make up this deficiency. But if the proceeds of the wheat crop were converted into oil meal it would be possible to feed 30 cattle on the produce of the forty acres and thus have 150 tons of manure for each corn crop.

Were we to arrange a rotation for meat and manure production now, however, the oat crop would be replaced by soy beans, a crop which will produce more food value to the acre in the latitude of Virginia, southern Ohio and Kansas than oats, and which possesses the double value of being able to secure a part of its nitrogen supply from the atmosphere and of producing a feeding stuff so rich in protein and fat as to be more valuable, pound for pound, than oil meal.

MAINTAINING FERTILITY WITHOUT MANURE.

The experiments I have quoted show that it is possible to maintain the productiveness of the soil by the use of chemical fertilizers alone, and Dr. C. G. Hopkins, than whom there is no better authority on questions of soil fertility, maintains that by the use of lime and phosphorus, in connection with the systematic returning to the soil of such portions of the crops as are not suited for human food, it is possible to maintain and increase the production of human food without the use of animal manures, and without the purchase of nitrogen and potassium in chemical fertilizers. He

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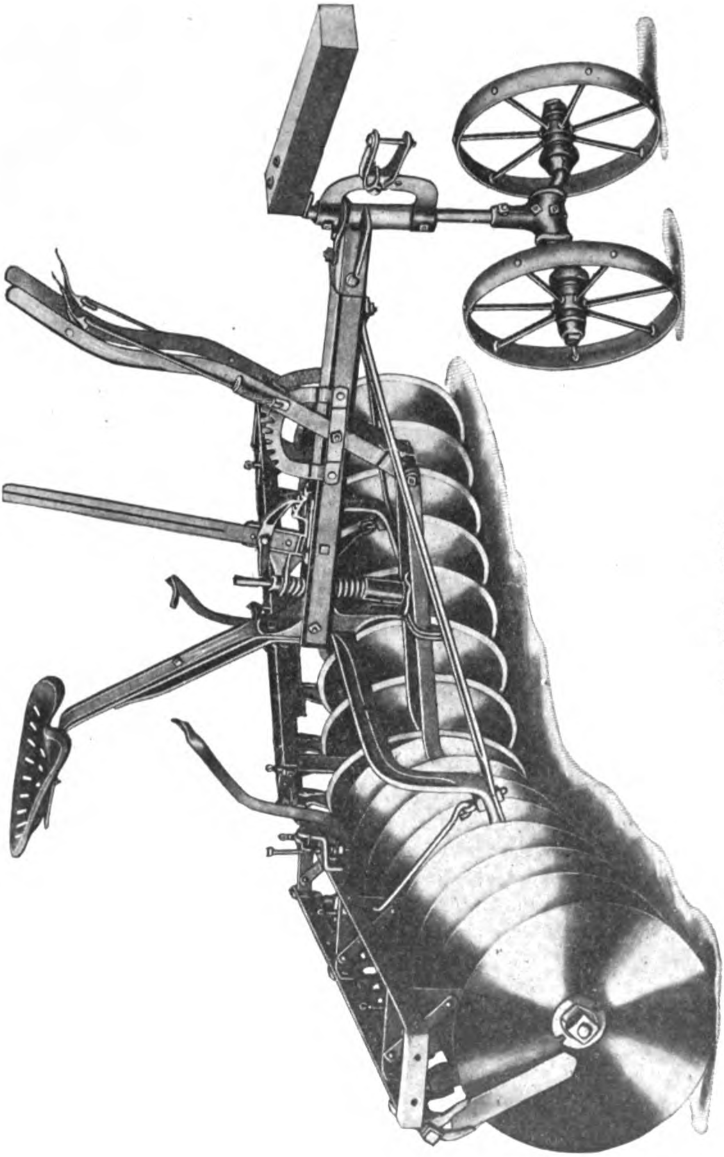

An effective disk harrow.

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also calls attention to the fact that the conversion of the grains into meat involves an enormous waste of potential food. I have already stated that it requires about ten pounds of dry substance in the food to produce one pound of live weight in a fattening steer, and I may go further and call attention to the fact that this one pound of live weight has less actual food value than one pound of the dry substance used to produce it, when that pound is derived from grains; hence it follows that when the time comes that population shall begin to crowd closely upon subsistence it will be necessary to curtail the production of meat by limiting animal feed stuffs strictly to such portions of the farm produce as can not be converted into human food. But as this condition approaches the price of meats will advance, so that it will be a very long time before the breeding and feeding of live stock will be less profitable than at present. On the contrary, if I read the signs of the times correctly, this phase of agriculture must increase in profitableness for many years to come. But the handling of live stock is a business that requires for its successful management a far greater degree of administrative ability than that required for the production of grain. There will therefore always be more producers of grain than of meat, and because of the greater skill required to produce meat than grain, the profit from the production of meat will be greater than from the production of grain. The explanation of the fact that there has not been a greater difference in these two lines of industry heretofore is to be found in the free ranges of the West; but these ranges will henceforth be a decreasing factor in meat production, both because of their exhaustion through over-pasturing and because of the encroachment of the area rendered available for cultivation by irrigation.

CONCLUSION.

In conclusion, my study of the problems relating to the maintenance of the fertility of the soil leads me to the conviction that, in the present stage of the world's development this end is to be attained most economically through the production of live stock and the systematic saving and utilization of the resulting waste products, both at the stable and at the slaughterhouse; supplementing these products from the deposits of the mineral stores of combined nitrogen, phosphorus and potassium; keeping the soil sweet with lime, and so adjusting our system of cropping as to provide for the greatest possible use of the nitrogen-gathering crops.

DISCUSSION.

SECRETARY COBURN: I notice you speak of manure by the ton. We seldom see two lots or even loads of manure that have the same proportion of moisture. One may be very much drier than the other, and I would like to know on what basis you figure this manure as to weight and moisture.

PROFESSOR THORNE: We have aimed to take conditions as we find them in the average Ohio barnyard, but we have aimed to compare manure similarly treated so far as moisture is concerned. We find that the manure contains about 80 per cent of water, as it goes into the barnyard. We take it out of the barnyard, and we find it may contain from 75 to 85 per cent, owing to the weather conditions at the time we take it out. We find that the water contained may be practically the same as when we put it in, but that the soluble elements of fertility were in very much larger proportion when we put the manure in the barnyard than when we took it out. Different kinds of manure vary; for instance, the manure from sheep sheds will carry nearly twice the amount of dry substance to the ton as manure from cattle barns will. It is much more valuable on that account.

SECRETARY COBURN: How do you differentiate between sheep manure or horse manure that is possibly two or three years old and is wholly fertilizer, and manure that was thrown out of a well-bedded horse stable a week or a month before, and which is largely straw?

PROFESSOR THORNE: We should have to go to the chemist for information on that point.

SECRETARY COBURN: You estimate this manure, then, on the same basis as you gave it, whether three years old or a week old?

PROFESSOR THORNE: It is either the fresh manure from the stable or else that which has lain three or four months exposed to the weather. We have found this point that may be of some interest: Where we have fed steers under roof in a stable, part on an earth floor that had been trampled by two or three years' previous feeding, and part on a cemented floor, we have found that in six months' feeding we have lost enough from the manure on the earth floor to have half paid the cementing of the floor. The weight of the ton will be the same, but we find that the valuable part has disappeared in the earth.

SECRETARY COBURN: It is all "manure," then, whether from a hay-fed dry cow or a highly grain-fed work horse, this week, or three or four years since. Don't you in some way recognize the difference in these?

PROFESSOR THORNE: Not much between the hay-fed cow and the grain-fed horse, as we are so much in the habit of feeding our horses corn. I do not know whether you feed all your horses oats in Kansas, but in Ohio we feed a great deal of corn, and corn is deficient in those elements which make for the value of the manure; but the most valuable manure we get is from dairy cows or steers that are fed soy beans or material of that kind. Manure is all manure, but is not all of the same value.

SECRETARY COBURN: As farming goes, then, a load of manure made on one farm might be worth five loads of other manure made under different conditions and from different feeds on another farm?

PROFESSOR THORNE: Undoubtedly.

SECRETARY COBURN: Yet in such calculations as yours is it possible you make no distinction between them?

PROFESSOR THORNE: Our point is this: that the farmer who is looking toward the conservation of the fertility of his fields will take these other points into consideration and he will know the effect that the different feeding is having upon the quality of the manure. Because the subject is so large I have not attempted to discuss all its features.

PROFESSOR JARDINE: Your experiments indicate that fresh manure is much more valuable than old manure. What would be your recommendation to the farmers of Kansas as to how to apply this manure, and when?

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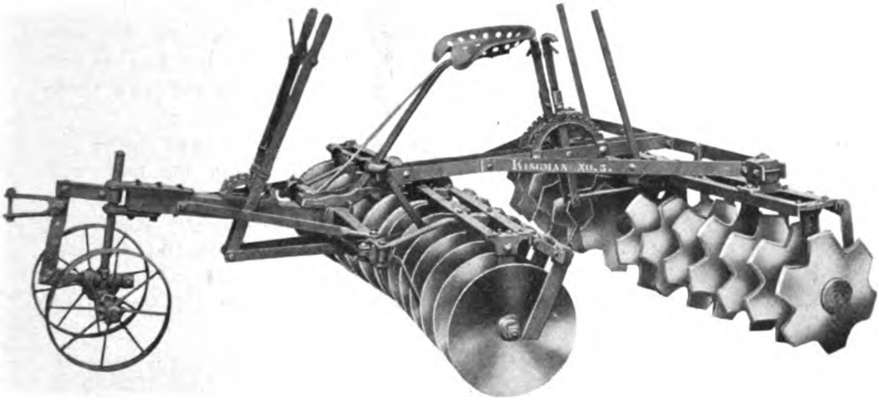
Professor Thorne: Our recommendation to the Ohio farmer is to get the manure onto the land immediately, as nearly as practicable in its perfectly fresh condition. It is not always practicable. Where not practicable to haul it to the fields immediately, then our advice to the Ohio farmer is to shelter it from the rain. In your less rainy climate it might not be so necessary, but with us the loss from rain during the winter is a very serious one.



A double disk harrow, to do the work of two at one operation.

Professor Jardine: For instance, right now, what would you advise?

Professor Thorne: Put it right out.

Professor Jardine: In a rotation of corn, oats, and probably cowpeas or clover or alfalfa?

Professor Thorne: The best results that we are getting is from manure that is spread immediately on the clover field to be plowed for corn.

Professor Jardine: A gentleman here wishes to know what effect it would have on a crop of wheat to apply manure on fall-planted wheat, this fall.

Professor Thorne: It would undoubtedly be beneficial in the majority of cases. Care would need to be taken, of course, to so spread it that there would be no lumps to smother the wheat.

R. B. Ward: When do you get the best results from your manure, the first year or the second year?

Professor Thorne: The first year.

R. B. Ward: I think it is entirely different in Kansas. We get better results the second year.

Professor Thorne: It is this way with us: With fresh manure, which carries a good deal of liquid, we get the best results the first year, but with other manure it may be quite different. With the fresh manure, in which a large part of the fertility is still in the liquid form, the liquid is the larger half of its value.

Professor Jardine: In a rotation of corn and wheat and oats, you would recommend the applying of the manure to the corn rather than to the wheat land?

Professor Thorne: You notice in experiments the corn responds more to the manure and the wheat to the fertilizers.

Geo. B. Ross: Is this large gain entirely due to fertilizers and manure, or is n't it a fact that part of that is due to better farming and better seed? We have expert seed men who display a chart like yours showing a big gain by seed, and we have other experts who show that better farming produces such results. In central Kansas, in Rice county, we use very little manure, no fertilizer and very little rotation of crops, but we put in one-third more labor on our farms and are increasing our crops materially.

Professor Thorne: This forty-acre experiment has been under the management of one farmer; there have been others, but the man who has directed the farm work has been the same throughout the whole experiment. It has been an experiment within an experiment. Each field is divided into about ninety plots. We have been using the different varieties of grain.

John Peck: If the ground were frozen and the land a little rolling, would you suggest hauling the manure direct to the field?

Professor Thorne: I tell our Ohio farmers that I have not the least doubt that we are losing several times as much from open barnyards every year as we would if we hauled the manure out fresh and spread it on the snow. I am not saying that is the best method. It is better than to let it lie in the open barnyard.

C. A. Johnson: I would like to know how much phosphorus and other minerals this manure carries, especially the liquid manure. I have a habit of my own of running the herd out on the sandy field and feeding there. I would like to know how valuable this liquid manure on the field there is.

Professor Thorne: Of course it varies widely, but a ton of mixed manure contains, on the average, about ten pounds of each nitrogen and potash, and about six or seven pounds of phosphoric acid. The acid all comes from the solid, in the case of cattle, and the nitrogen and potash largely from the liquid, so that I can not give you off-hand the proportion from each one, but those proportions roughly stated here will give you the idea. There is more real value in the liquid than in the solid, provided the liquid is used with some phosphorus. I showed you on the chart where we used nitrogen and potash without phosphorus and a large part of the effectiveness was lost. We built several cisterns to catch the liquid, and haul it out and spread it over our fields. After we had stopped our experiments, we stopped up all our cisterns. We aimed to get the liquid out with the solid, thoroughly mixed together, because the liquid is deficient in that one element, phosphorus, even the complete manure, but the liquid is much more deficient, and therefore we are mixing the liquid and the solid and then reinforcing the phosphorus in order to get a larger proportion of liquid in the manure.

John Peck: You spoke about this phosphorus being hauled off. I would like to ask if that burns up when the cornstalks are burned?

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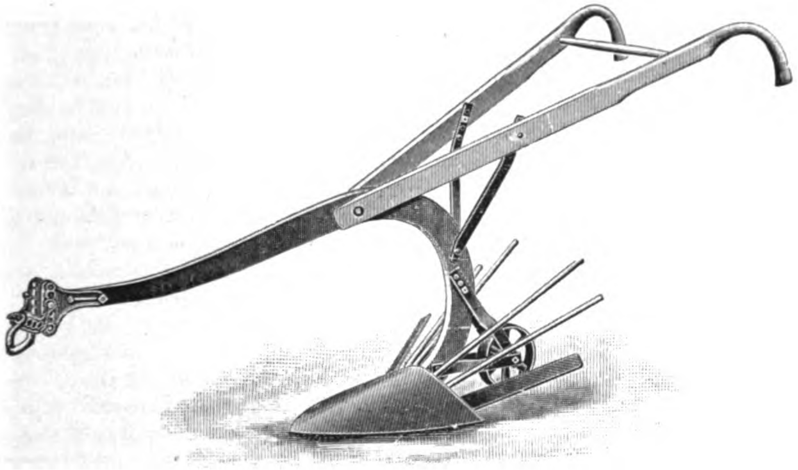
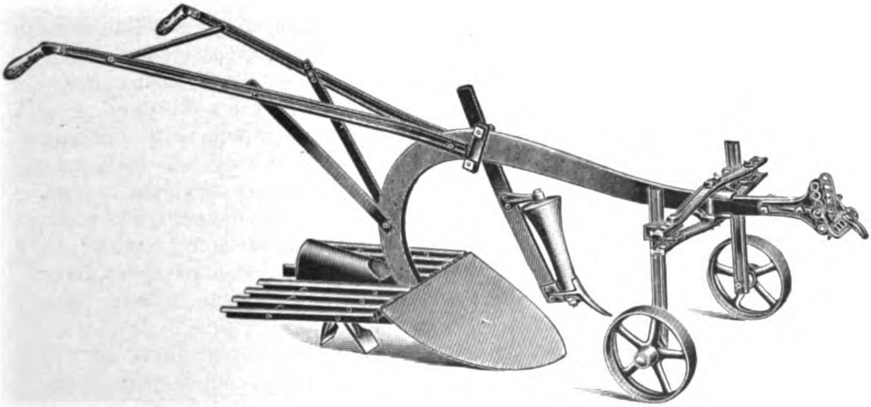
Professor Thorne: The phosphorus is a mineral and stays in the ashes. We lose only the nitrogen in burning, and while the phosphorus is not lost it is converted into a less available form. It becomes more like the rock, and therefore it is a disadvantage to the phosphorus, as well as the other elements, to burn the material. The ashes will carry the potash without injury, but the phosphorus will have lost part of its immediate availability by burning.



Potato digger.



A shaker potato digger, with fore carriage.

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IRRIGATION BY PUMPING IN WESTERN KANSAS.

By F. D. COBURN, Secretary State Board of Agriculture.

There is scarcely an agricultural region anywhere that would not at some period in almost any season consider itself fortunate if water could be had for its crops when timely rains are not forthcoming. Even in New Jersey, New York and other eastern states, irrigation plants are installed to supplement the rains and as insurance against their failure.

Every region is subject to the vagaries of the weather. In some years there is sufficient seasonable rainfall for the growth of excellent crops; in others yields are materially reduced or made impossible by lack of it, and this applies almost universally. Western Kansas has one advantage over the humid countries, however, in that it seldom suffers from too much water. With water at just the right time, the rich soils of the prairies produce prodigiously, and wherever there are irrigation waters available they should be utilized. Irrigation farming is often referred to as the ideal agriculture. Intelligently followed on the plains, there is small question as to yields, and surroundings there are most favorable for harvesting and curing crops in the best possible condition.

For years the feasibility of utilizing the underground waters of western Kansas for irrigation has been discussed at the annual meetings of the State Board of Agriculture, and learned scientists have contributed much on the subject that was pertinent and of interest. While it was agreed that the west third or half of the state possessed a so-called inexhaustible underground water supply, it seemed the consensus of opinion that it could not be profitably made use of for the irrigation of any considerable areas on the high lands, because of the lift being too great. Irrigation of the valleys, where water is near the surface, by pumping, long since passed the experimental stage, and its possibilities are not yet fully realized, as each season sees some new development.

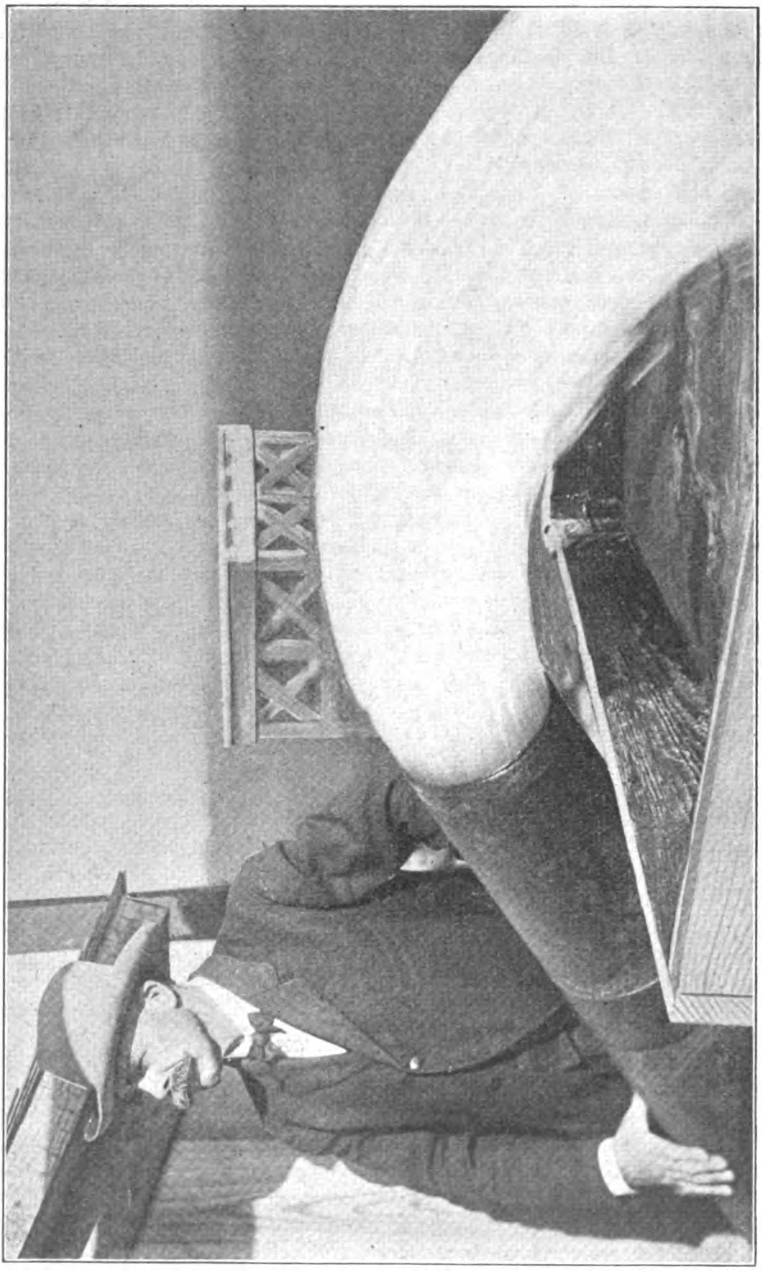
In the Arkansas river valley from Garden City to Syracuse many pumping plants are in operation or being installed. Finney county alone has 50 or more plants, including a number on the upland, with capacity for irrigating approximately 6500 acres. Kearny county has 40 plants, each of 1000 gallons or more per minute, and Hamilton county has eight. These are all equipped with centrifugal pumps, and principally use gasoline or distillate engines, for power. In addition and incidentally, it may be mentioned that considerable areas are also irrigated direct from the river where or when water is available from that source, and from reservoirs where flood waters are stored.

In the Arkansas river valley the depth to water is only 8 to 10 and 15 feet. The main valley, four to six miles wide, bounded by sandy territory on the south and by the loamy uplands on the north contains what is termed the "underflow," and here are the shallow wells. This so-called underflow has been developed sufficiently so that it is pretty well known what can be done with it. As a rule 400 gallons per minute may be depended on from each well. Therefore, if 2000 gallons per minute is wanted a group of five wells is put down; if 4000 gallons per minute, a group of ten wells is used. The wells of each group are connected with a suction line leading to one centrifugal pump. The pump and suction line are set at water level, and the pump operating either by electric motor or an oil engine, as the case may be. These plants have proven very successful, and after several years of heavy pumping there appears to be no diminution of the water supply.

The United States Sugar and Land Company of Garden City, Kansas, which controls extensive areas in that vicinity and owns and operates the beet-sugar mill there, has a novel central power station for pumping at Deerfield, in Kearny county, about 12 miles west of Garden City. They make a producer gas out of cheap residuum oil, and have a 400 H. P. gas engine and 350 K. W. generator. The current developed by this generator is distributed over a transmission line twenty miles in length, and under this line the company has fourteen pumping plants, with a capacity of 1800 to 2000 gallons per minute. About 3500 acres of land is irrigated from this system. There is also a government plant at Deerfield, which generates electric power to run twenty-three plants. These are the shallow wells in the valley, however.

While developing the underflow for irrigating the valley lands is important, the great significance of the later investigations is the demonstrating here and there that the uplands can be profitably irrigated by pumping from deep bored wells, as these lands comprise by far the greatest acreage. Their soils are rich and of such texture that experts declare they will need less (some say only about one-half as much) water to produce crops as the sandier lands of the valleys. Again, there will be seasons when the rainfall will be such as to require only partial, if any, use of the pumping plants, and it begins to look as if many thousands of acres of western Kansas may be made reliably productive through artificial watering.

There are a number of wells being bored and put into use on the higher lands at the present time, here and there, from Meade county, in the southwest, north and west to Cheyenne county, in the northwest corner. At Fowler, in Meade county, the Walker well is finished and in use, as is the Hawley plant, of similar size and equipment. Two or three other centrifugal pumps are also installed in the county. In Sherman county, adjoining Cheyenne, five big wells have been bored into the gravel that carries apparently unlimited water, and are now in operation. This suggests in a very general way something of the territory where a water supply is being proven available for irrigation by pumping. Only one of these big upland wells was in commission during the crop season of 1911. This was the J. W. Lough well, about twelve miles southwest of Scott, in Scott county. From it were irrigated 180 acres, all that could be made ready in time for planting, but the owner estimates that the well will take care of 320 acres. On the 180 acres were raised potatoes, beans, cucumbers, watermelons, turnips and other vegetables in profusion. The yield of milo was sixty bushels per acre, and oats and barley fifty bushels. Sorghum grew to the height of ten feet. This was planted the first of



Pumping water on upland at the rate of 1600 gallons per minute from the Lough well, in western Kansas.

June, irrigated three times, and cultivated. Another field was broadcasted to sorghum the first of August, irrigated twice, and attained a growth of about six feet, making the finest quality of fodder. From a 31-acre field of alfalfa, sown in 1910, four cuttings were secured the next season, averaging about a ton to the acre for each cutting. This is notable not alone because there was no considerable rainfall there in 1911, but because the summer was unusually hot, one of the most trying and unfavorable in years. The weather itself subjected the demonstration to the severest test, and the results, in spite of the inhospitable conditions, were most gratifying. This year (1912) Mr. Lough reports equally satisfactory results. July 28th, he advised: "I have cut my alfalfa twice and the third cutting is almost ready. I believe by crowding this alfalfa with water I could get five cuttings each season, that would aggregate at least five tons per acre. My flax, milo, Kafir, sorghum, broom-corn and melons are all flourishing. The water makes its mark wherever it goes."

Mr. Lough's well meets the water-bearing sand and gravel at a depth of 60 feet and extends through seventy feet of it. Owing to the abundant supply of water available he has planned to put down other wells in this deposit and operate them by electric power something after the fashion of the Deerfield method of the United States Sugar and Land Company, previously described. It is his intention also to furnish this power for the pumps of his neighbors who put down wells, so all a man would need to do to start the machinery and bring a flow of water would be to turn a switch connecting the current with his plant.

The writer received a recent letter from Mr. Lough, in which he says:

"Since your first investigation of irrigation by pumping in Scott county, Kansas, in which I am much interested, and since your report of the same, I have been besieged by requests for further facts. In order to give the inquirers and general public information as to details, I have prepared the following; but not for the purpose of selling land, as I have none to sell. I have quite a large tract that I am beginning to develop, and I am still buying more:

"Scott City is in the exact center of the western third of Kansas. We now have two wells equipped with pumps and engines, one being on the section one mile east of Scott City, the other about twelve miles southwest. Both were thoroughly tested during the hot, dry months of July and August, 1911, by pumping both day and night several days in succession, without lowering the water in the wells more than 12 or 14 feet. The well east of Scott is 36 feet to the water and 110 to its bottom; the other is 63 feet to the water and 130 feet to bottom.

"The source of the water supply is undoubtedly in the Rocky Mountains of Colorado; it has been tested in different ways, showing that it constantly flows eastward. To my certain knowledge there is no difference in the volume of this underflow, whether the rainfall be scant or heavy.

"The water is always clear, cold, soft and pure, and healthful for the growing of all vegetation. This water is found in coarse sand and gravel, and at different depths, say from 15 to 75 feet from the surface, and in some cases more. The water-bearing sand and gravel varies considerably

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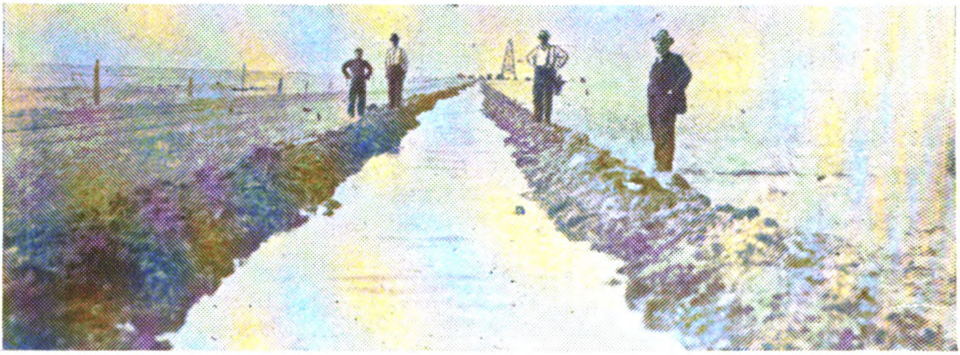
in thickness, from a thin stratum up to 60 or 70 feet. The big wells are governed by the thickness of the sand and gravel, as the big underflow does not extend all over the county. But in cases of less extensive strata of sand and gravel not sufficient to supply a big pump, a smaller and cheaper equipment can be used with considerably less expense.

Alfalfa, fourteen months from sowing, on the Lough ranch, in Scott county. Sowed in the summer of 1910, yielding in the following year four cuttings, averaging a ton per acre each, under irrigation, in the dry season of 1911.



The main ditch conducting water from the Lough well.
This well is estimated by its owner to supply water for 320 acres.

"Our wells are 24 inches in diameter, cased with No. 8 iron or steel, and cost $3 per foot down to the water, and from there to the bottom of the well I use a screen of the same size, perforated to let the water in and hold the sand back, which cost $8 per foot. Our pump is a Layne & Bowler, made in Texas, and the engine for power is a Charter gas engine with Solar oil attachments, made in Illinois. Both have proven successful in actual use. There are also various other pumps and engines being offered for the same work.

"We can pump 1500 gallons per minute, and water or flood one acre per hour. The fuel and lubricating oils will cost about 40 cents per hour for a 60-horsepower oil engine. Cost of a plant will depend on the depth of the well, as the deeper and greater the lift of water the larger the engine must be; in other words, it takes more horsepower, and this costs about $30 per horse; also, the labor for making the well will cost $3 per foot, the casing $3 per foot, and the material in the pump figures the same way per foot. The deeper the well the more it costs. The average pump will cost about $550. This is a centrifugal, and will draw water 100 feet or more; it is altogether different from a plunger suction pump, as it does not require leather valves at all, but just a rotary motion, with paddles or fans, and at a high speed this forces the water up. The pump troubles are very small.

"The difference between dry farming and irrigation is wide. With water, four good crops of alfalfa can be raised on the high uplands, even though it is 100 feet to the water; without the water we can not raise much alfalfa on such land from the natural rainfall. After alfalfa is once started it does n't require any more seed, plowing or cultivation; it becomes better right along and improves the soil. Other crops are made certain by irrigation.

"One can buy land here from $15 to $25 per acre and up, owing to location, improvements and prospects of a water supply. From one well and pump I irrigated 180 acres in 1911, and raised good crops. Alfalfa sown July 10, 1910, made four good cuttings in the summer of 1911, and the four cuttings meant at least a ten-foot growth. Sorghum planted in June reached ten feet in height, and that drilled August 1 grew six feet high and made fine feed. I had excellent oats, barley, milo and Kafir. I would advise, if one cared to know what my irrigated crops look like, to send to M. R. Potter, photographer, Scott, Kan., and secure picture cards showing crops in the fields and the alfalfa stacks, which will explain more than my words can express. The cards cost five cents each."

This experiment of Mr. Lough's suggests in a striking way what the seemingly abundant water, so close at hand, utilized at the right time makes possible on those rich soils.

This well of Mr. Lough's is 130 feet deep, with 24-inch casing. The total cost, including pumping equipment, was not far from $3500. As he was a pioneer in this, adjustments and changes after installation added quite a bit to the cost. The Niquette well, of practically the same depth and equipment, at McCue, the first station south of Scott, cost $3200, complete. Each of these wells, it is estimated, will irrigate a half section. If this proves correct it means an outlay of but $10 per acre for a permanent water right, owned and controlled by the individual.

The Lough well extends through 70 feet of the water-bearing gravel, without a layer of any other material. This makes it 60 feet to water. The water stands higher in the well, of course, when the pump is not working, and when the engine is started the water is gradually lowered to about 75 feet from the discharge, which is the extreme distance the water is lifted. Thus far no amount of pumping lowers the water head beyond that point. The equipment is a centrifugal pump and a 60-horse-power fuel-oil engine, and water is steadily lifted, according to Mr Lough's report, at the rate of 1500 gallons a minute. This is carried in ditches by gravity direct from the well to the land watered, some of it two miles from the pump, and no reservoir is used or regarded as necessary. This first year's experience indicates that the cost of putting the water on the land is about 50 cents per acre at each irrigation. The engine burns about

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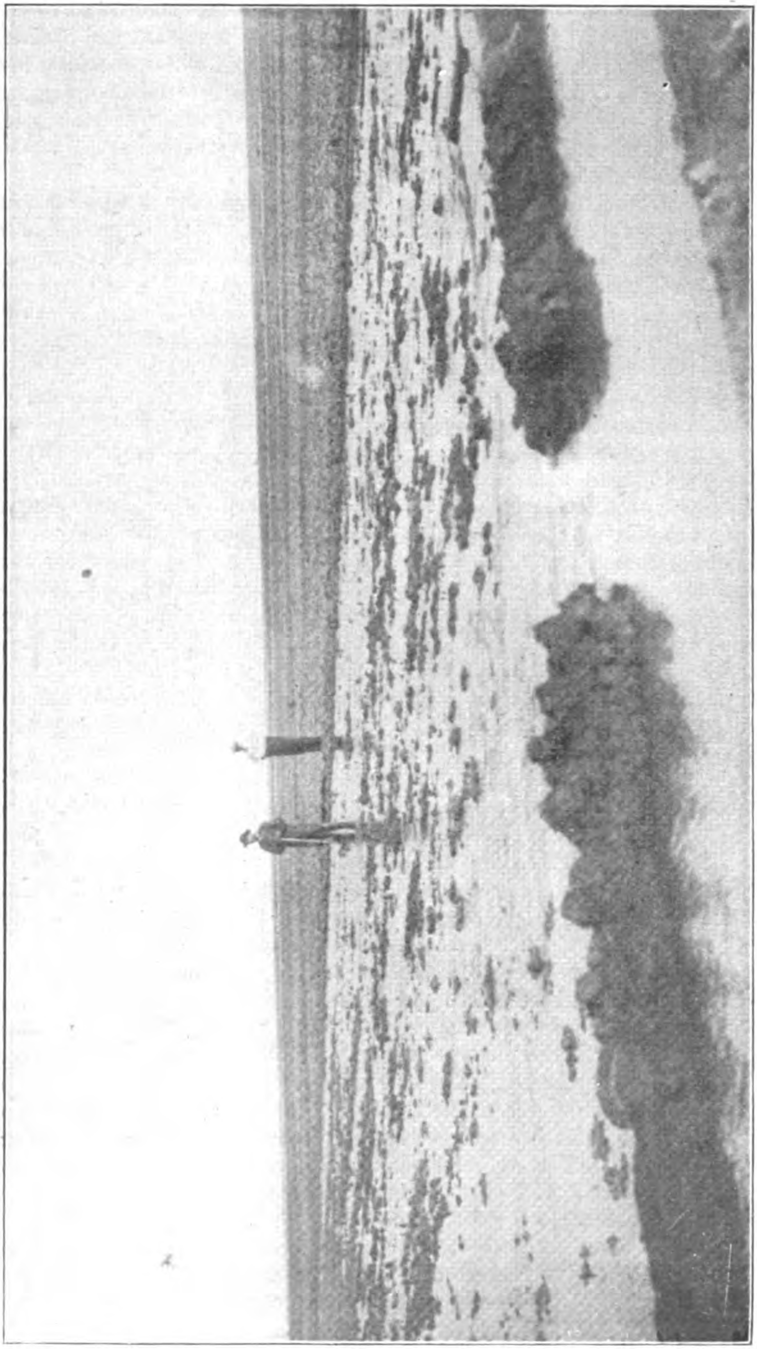

Irrigating an alfalfa field with pumped well water in Scott county, Kansas.

100 gallons of oil every 15 hours, costing 2½ cents per gallon laid down in Scott. The well is located on one of the highest points in the township, and the water is drawn through a 9¼-inch pipe.

The most extensive developments with upland or deep wells, however, and following Mr. Lough's lead, have been made in Finney county, by numerous individuals, and the United States Sugar and Land Company. There are several wells estimated to supply water for irrigating 500 to 800 acres each, and one is equipped with a 150-horsepower engine, for power. The general manager of the United States Sugar and Land Company, Mr. F. A. Gillespie, furnished (in July, 1912) the following information as bearing on pumping water on the uplands:

"We just discovered last fall that we also have apparently unlimited water under our uplands, although the proposition there has not been worked long enough to tell that this water is absolutely unlimited. We consider that this is one of the greatest discoveries made in the Central West, and believe that the supply will absolutely prove permanent. The wells are from 300 to 375 feet in depth. We have two of these plants in daily operation now, both of them by oil engines. One is being used for irrigating 500 acres of beets. It is pumping 1800 gallons per minute, twenty-four hours per day. The other is pumping about 2100 gallons per minute, and being used for irrigating beets and diversified farm crops. Both of these plants have been operated several weeks this year, and so far with no diminution of the water. Our company and individual owners together have put down nearly twenty wells on these uplands, with not one failure to get the water. As I suggested, we have upon the uplands two wells in daily operation and one farmer has two more in daily operation. The other wells are not yet equipped with power.

"These deep wells are put down first with an 8-inch hole, which we term the test hole. This hole gives us the log of the well. In other words, we determine by this test hole, the different strata in the formation encountered. We then make the casing according to information given us by this log, putting in a screen wherever we strike sand or gravel, and blank casing other places. The well proper is 24 inches in diameter, to a depth at which we set our pump. With the experience we now have, we are putting all of these 24-inch wells to a depth of 200 feet; then below this 200 feet we continue on down with a 13-inch well to the bottom of the hole. This allows us to insert a submerged pump to a depth of 200 feet."

The United Well Works report that they have "put down some twenty irrigation wells here in western Kansas, of which a number are being successfully operated at the present time. The others are not yet outfitted with power. The prospect for the immediate future is very good. We have operated all through Arkansas and Texas and believe water from wells showing 1500 gallons per minute can be successfully lifted 300 feet." Doty & Williams, another firm putting down wells in that region, seem no less optimistic.

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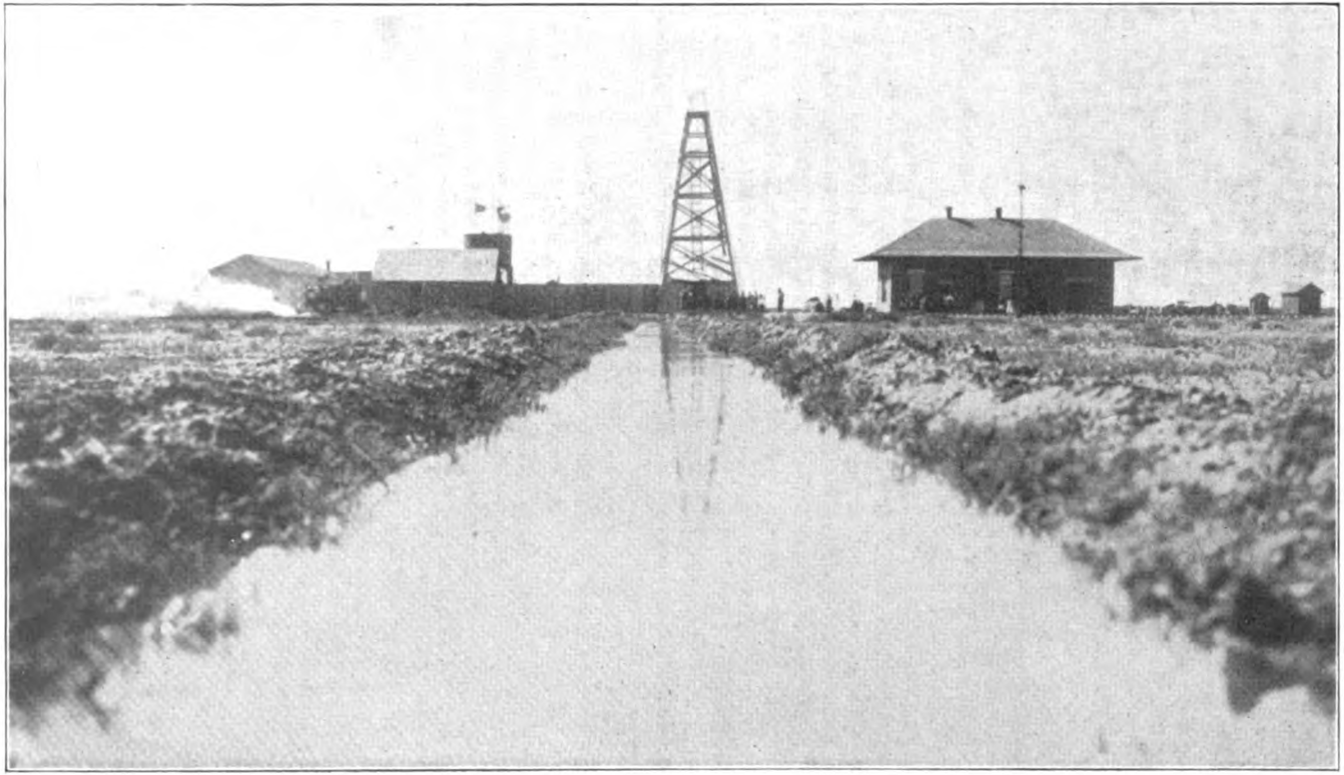

An irrigation ditch of pumped well water in northern Finney county, Kansas.

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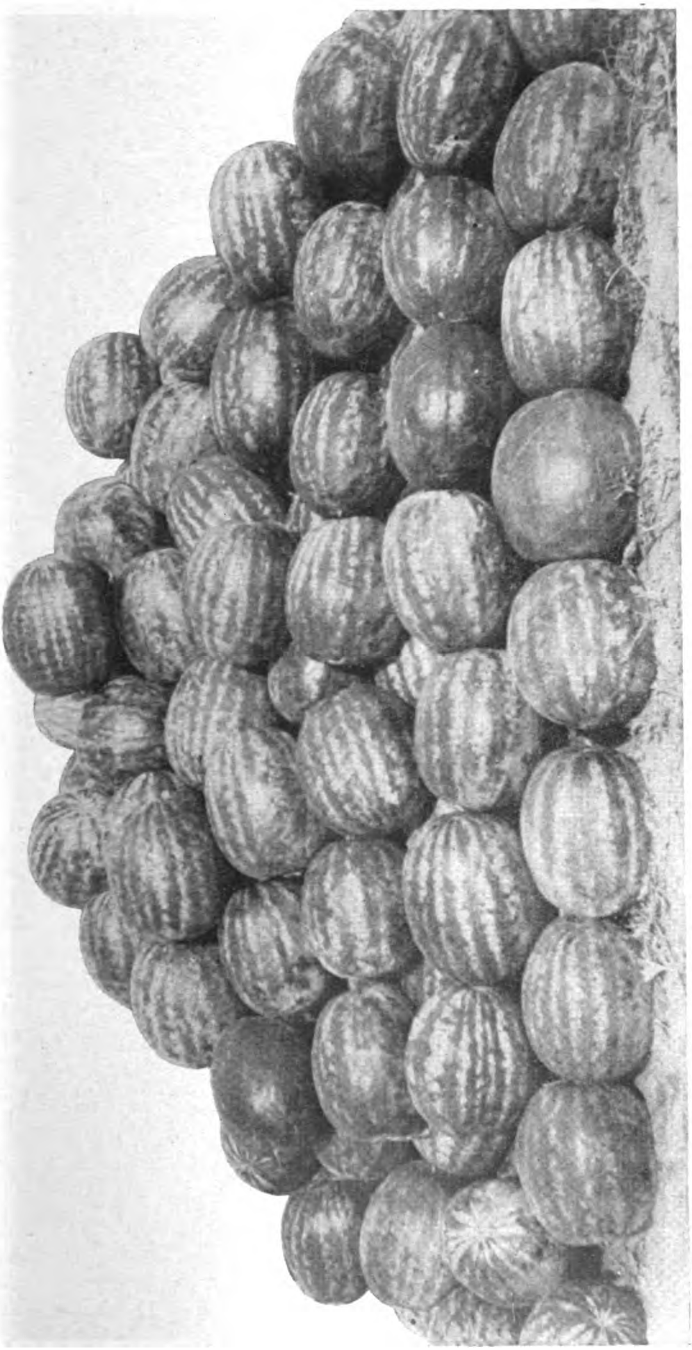
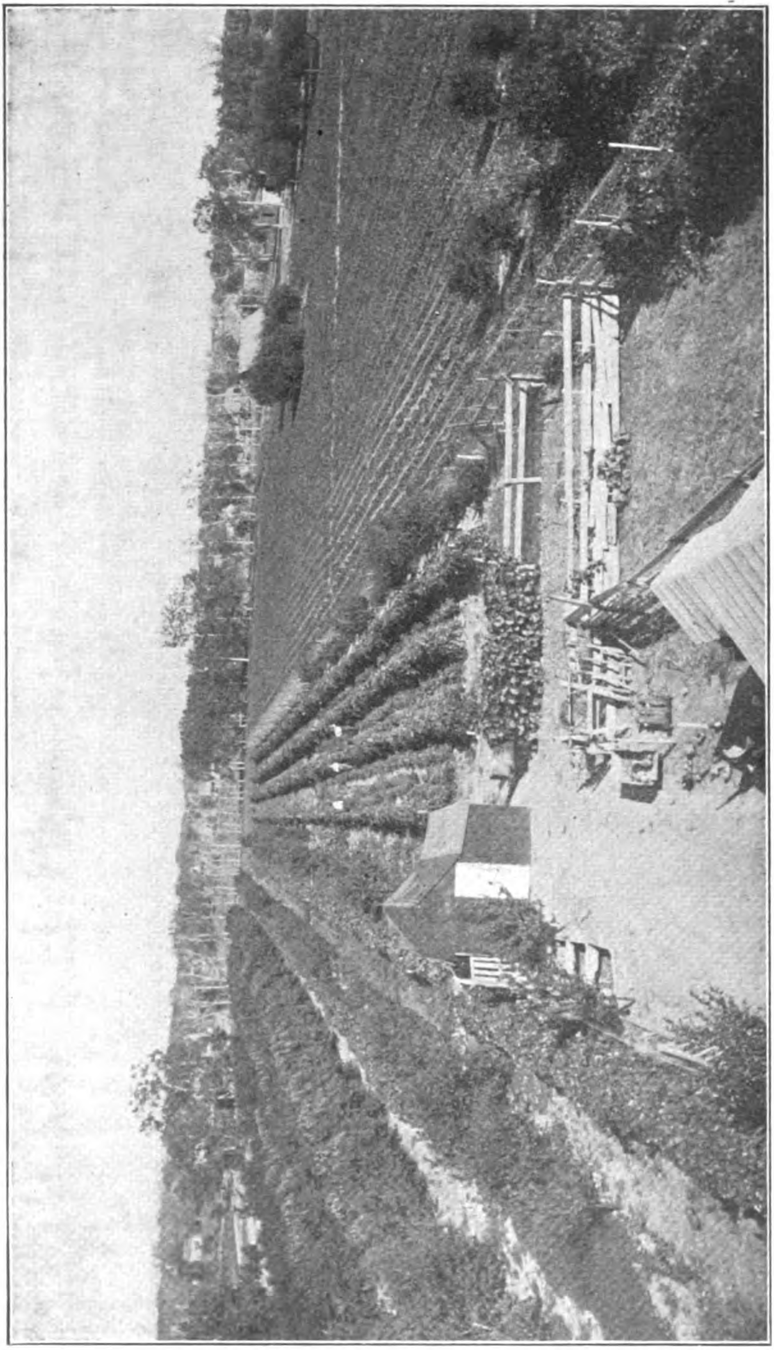


An attractive pile of attractive watermelons, such as grow under irrigation.



The P. Finello fruit and truck farm, in the suburbs of Garden City, upper Arkansas river valley. Transformed from a bare spot by water from **a well costing, with complete pumping equipment installed, $298.**

In Sheridan, Sherman, Thomas and Cheyenne, in the northwest; in Scott, in the central west; in Finney, Kearny, Hamilton and Gray, through which courses the Arkansas river; in Meade, on the southern border; in Morton, in the extreme southwest corner, and Stanton adjoining it on the north, are various irrigation projects, the water supply being artesian flow, or from rivers, creeks, and wells.

The deeply driven upland wells, however, seem to promise by far the greatest possibilities, and these, with centrifugal pumps and powerful cheap-fuel engines, are helping to solve the problem of utilizing the underground waters to irrigate the high lands. To what extent this may be carried on no one can at this time tell, but that it should be developed to its fullest capacity is patent.

One of the most striking examples of the transformation possible by irrigation in western Kansas is afforded by the experience of P. Finello, on two acres in the outskirts of Garden City. This, of course, is in the Arkansas river valley, where the distance down to water is only about nine feet. When he moved on the land it was devoid of trees or vegetation, and now it is a wonderful garden. In the spring of 1908 he installed a pumping plant consisting of a seven-horsepower gasoline engine, and a centrifugal pump and accessories, at a cost of $293. His well is 46 feet deep and 16 inches in diameter. The pump draws 265 gallons per minute, with no perceptible decrease in the water supply, at a cost of about seven cents per hour, and in six hours the entire tract can be thoroughly watered. Mr. Finello's actual work with trees on this tract began in 1908, and he has on the place about 80 each of cherry, peach and plum, and 1500 grape vines, all now coming into bearing. Between the trees he raises vegetables in profusion, such as tomatoes, beans, peppers, cantaloupes, and watermelons. It is a most impressive demonstration of what a combination of soil, sunshine, intelligence and water will do in that region, and is suggestive of future developments.

Much interest has been manifested lately, too, in the development of artesian water, the firm of Wilson & Dean, at Richfield, in Morton county, having brought in the best well of this character in Kansas, with a natural flow of 600 gallons per minute. While only a limited area could be made ready for crops in 1911, it was sufficient to show strikingly the wonders that water will bring about. Alfalfa sowed on sod June 20, 1911, yielded one and one-half tons per acre for the season and is a perfect stand. Trees in a park that has been laid out made an excellent growth, and a great variety of garden truck returned good yields. This same firm has obtained artesian flow in a second well, and an outfit is now drilling for artesian water at Hugoton, in Stevens, adjoining Morton county on the east. Also Meade, the third county east from Morton, has numerous artesian wells, used, however, only in a very limited way for irrigation.

Mr. Wilson, of the Richfield firm mentioned in the foregoing paragraph, in relation to conditions in Morton county, says: "It has been estimated by parties who understand the situation somewhat that by putting in a centrifugal pump a supply of 1500 to 2000 gallons of water per minute can be had, but as yet this has not been proven. There is not the least

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doubt, however, as to the supply of the underflow generally throughout the entire county, ranging in depth 20 to 100 feet. In the first artesian well we put down here there is 100 feet of water-bearing sand and gravel, and in the second there is 140 feet. This formation was tapped at a depth of 60 feet. The water flows freely in it and my opinion is that the supply is inexhaustible."

In Sherman county there was put down an "artesian test well" at Goodland. It is now driven to a depth of 2000 feet, in August, 1912. The log of this well shows three strata of water-bearing sand and gravel, the third being the strongest. Goodland is about 135 miles due north of Richfield, on the crest of the divide between the Smoky Hill river and the Beaver creeks, and "here it is 150 feet to water," according to J. H. Stewart, of that place, who adds: "Approximately there is 80 to 100 feet of water-bearing sand and gravel."

An interesting project is that of the Gilbert Bros., in Gray county, who are expecting to utilize the Arkansas river water when available, by means of the diversion dam now being built, and pump at other times from the underflow, which collects in a lake-like reservoir called a sump. Their canals extend for miles in Gray and Ford counties and into Edwards. Another unique plant has been installed by E. E. Frizell, of Larned, which pumps water from Pawnee creek to serve 1000 acres of alfalfa. John Ackard & Son, of Colby, Thomas county, have a plant working satisfactorily on a paying basis, pumping 500 gallons per minute, with a 25-horsepower engine. They give it as their opinion that "at least 25 per cent of the land in northwest Kansas can be watered by power irrigation and profitable results obtained from the underflow. We have reason to think that the underground water is sufficient to irrigate all this country, and we look forward to some one inventing a more economical system for bringing water to the surface from the greater depths. We have the only centrifugal pump operating in this county at this time." These various examples of plants on the extreme south and north, as well as those here and there between, are cited more especially to show the extent of the underground water supply, and are not intended as a census of the irrigation enterprises in that region. Space would not permit the enumeration of each, but the territory of present greatest activity is from Garden City, north and west.

Often the distribution of rainfall in the western end of the state is adequate for various crops, but wherever the underground waters are found in sufficient quantities it is undoubtedly good business to use them as supplemental to rains that may be tardy in their coming. Under irrigation the farming will be more intensive and develop along lines quite different from those followed at first, supporting a greatly increased population. Wherever irrigation by pumping may be done it will bring about wonderful changes, and where, for any reason, large wells are not practicable or possible, garden patches can and should be watered from those of less capacity. The possibilities in this direction are suggested by a Gove county man's experience in 1911 in irrigating a half-acre garden from a

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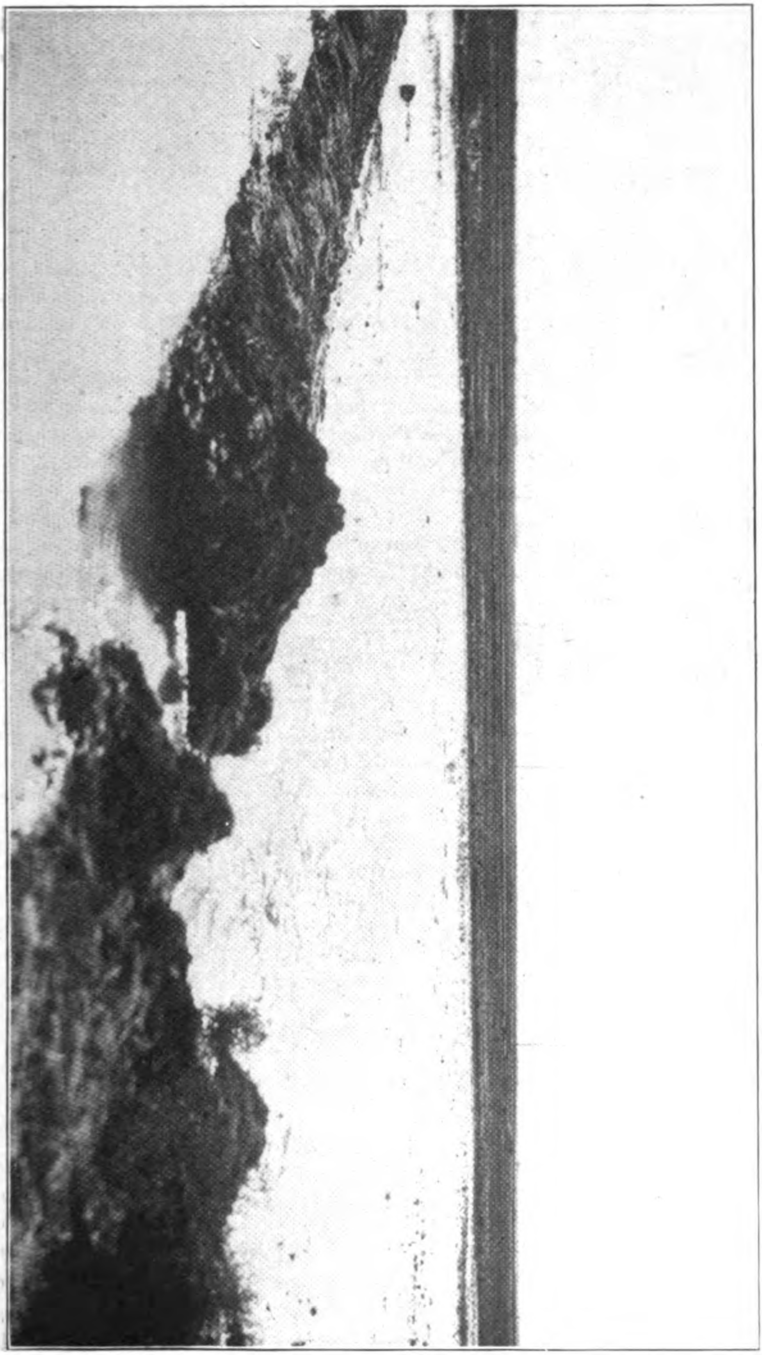

Flooding alfalfa land with pumped well water, in Finney county, Kansas.

small well for watering live stock, the water being lifted by windmill. The value of the produce from the half acre is reported as follows:

Vegetables sold	$20 00
Cucumber pickles in brine	12 00
Onions	4 00
Potatoes	45 00
Pumpkins	4 00
Sweet potatoes	2 00
Total	$87 00

In addition to this there was "an almost endless amount of truck, such as green onions, radishes, tomatoes, cabbage, peas, beans, muskmelons, watermelons, that we used ourselves," to quote the words of the farmer himself.

The developments and experiences of the past eighteen months seems to demonstrate conclusively not only that the water is available in western Kansas in immense quantities—from a sort of subterranean lake as it were—but that it may be successfully and economically raised for irrigating quite extensive areas. As one westerner said: "It does n't matter much what it costs to get the water up, if we can lift it in such quantities as we are now doing." And he was right, for its use is transforming land of otherwise questionable value for agriculture into most valuable tracts of great productivity.

PUMP IRRIGATION IN SCOTT COUNTY, KANSAS.

By E. H. Epperson, editor *News-Chronicle*, Scott.

The agitation for pump irrigation in Scott county began about three years ago, but with the exception of a demonstration well put down by E. E. Coffin, nothing was done but agitate and stir up interest that season, which was followed the next season by an irrigation plant installed by J. W. Lough, which for volume of water and inexhaustible supply has proved to be the wonder of this part of the state.

With the installation of this plant Mr. Lough began immediately the work of practical irrigation, with results that have been most gratifying, and his enterprise has grown until this season he is irrigating over 200 acres from this one well. Mr. Lough says the more experience he has the better satisfied he is with the pump irrigation. He has been raising a diversity of crops, but intends to confine his energies next year almost exclusively to alfalfa-growing.

Frank Petefish has been a close second to Mr. Lough in practical irrigation, although he confines his efforts more particularly to potatoes and other like crops and is meeting with the most gratifying returns.

These primary efforts have already received considerable publicity in this and other states, and while the area irrigated has not been enlarged materially over that of last season, interest in irrigation has been aroused immensely and confidence in the reality and practicability of successfully pumping water from our unlimited underflow has reached a point where no doubt whatever exists, and plants are being installed this season which will next year result in an increased irrigated area of five or six hundred per cent.

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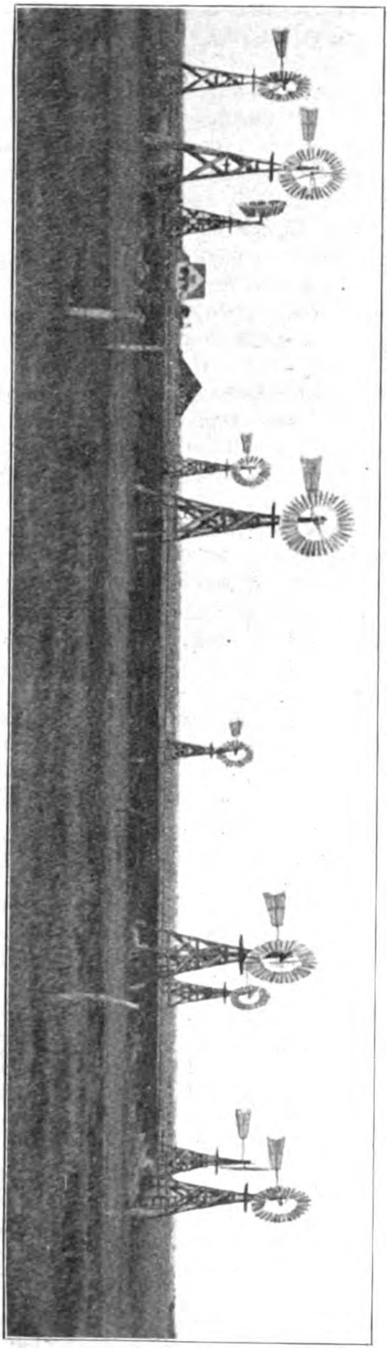

F. H. Mahler's windmill irrigation plant, in Scott county, Kansas. Note the ten mills.

Mr. F. H. Mahler has made a new departure by constructing a windmill plant. He has ten windmills surrounding a large reservoir which when full will irrigate 5 acres of land at one time. He has succeeded in caring for about 60 acres of land with results that have been everything that can be desired. E. E. Coffin is also installing a plant after this plan.

Wells have been installed this summer by H. J. Mott, McCracken Bros., and some others. Test wells have been put down by several parties. These tests are made to find the coarse gravel beds, which give a much more desirable water flow and are invariably found by two or three efforts. One of the most remarkable was found by Dr. Mattson, of Omaha, this week (September 5, 1912), who found water at 22 feet, went 85 feet into coarse water-bearing gravel and stopped without going through the gravel bed, because the supply is equal to any demand that could ever be made upon it.

The importance of irrigation plants is constantly impressing our people. We could name several instances this season where parties in attempting to start alfalfa without it have actually lost enough to pay the entire cost of an irrigation plant. With irrigation Mr. Lough has broken prairie sod and seeded it to alfalfa the middle of May, from which he will harvest two tons of hay per acre this first season. Without irrigation he would have had nothing. This is taking Scott county prairie sod and making it worth $100 per acre within six months. This is no idle dream, but an actual reality that is making our people open their eyes in amazement, until every man that possibly can raise the means is figuring on an irrigation plant.

Our water supply is the most remarkable there is anywhere. The possibilities it unfolds are almost as surprising as the wonderful Aladdin lamp. The greatest obstacle in the way of our development is the great cost of the irrigating plants, which are beyond the reach of people of ordinary means, but the wonderful inventive genius of man will soon overcome this, and soon millions of gallons of our vast underflow, almost as pure as the mountain snow, will be pulled to the surface annually, producing results little dreamed of by the present generation.

IRRIGATION IN FINNEY COUNTY.

By I. L. Diesem, Garden City, President State Board of Agriculture.

The year 1912 may be properly termed a successful one for irrigation in the Arkansas valley. Owing to heavy snowfall in the mountains last winter there was more water in the river than for several years past, and hence more land was irrigated from the river direct, and more water stored. Furthermore, Colorado had more rainfall in the summer of 1912 than for several years, and this helped to swell the river on several occasions. This not only made available more abundant water for irrigating direct from the stream's flow, but enabled the sugar company at Garden City to fill its huge reservoir, Lake McKinnie, several times during the period of high water, this reserve supply being used later, or when needed, for sugar beets or other crops under the reservoir. The irrigated crops in the entire district have done well. The feeling is that the 1912 beet yield will prove the largest since the introduction of the crop to the state, or 80,000 tons.

People in this as well as other districts are realizing that the more judicious use of water, making it reach farther and handling it more economically, are essential points and to the best interest of all who irrigate. By the close economy of water many more acres can be irrigated in this district, and the future will see this brought about.

The pumping plants of Finney county also indicate the advance in irrigation, and the value of water on the different crops. At least fifty pumping plants in this county did good service in 1912, and without exception were instrumental in raising a good money-paying crop in each instance. The large wells driven and plants installed by the sugar company and others on the uplands are a decided success. One of these deep wells furnishes 1800 gallons of water per minute and has irrigated 300 acres of beets during the season. Another well that furnishes 2000 gallons per minute irrigated 200 acres of beets and in addition other fields devoted to diversified crops. All of the large new wells put down show no lack of water, the pumps lifting from 1000 to 2000 gallons per minute, many of these pumps having been kept in operation 75 to 100 hours without stopping, the wells showing no decrease in the water supply. The Carter plant at Holcomb, capacity 4000 gallons per minute, easily took care of 320 acres of beets, running time for the season being 45 days, ten to twelve hours per day, and finishing the crop with the last irrigation the first week in September. This plant consists of a chain of twelve wells, one centrifugal pump and a 60-horsepower crude oil engine.

Centrifugal pumps are being installed almost entirely, and gasoline, coal, crude oil, and some places naptha and kerosene are the fuels used. The writer prepared a list of pumping plants in use in Finney county, and, while he may have missed some, there were 50 enumerated. Their capacity is about 6500 acres, the actual area irrigated in 1912, however, only amounting to 4000 acres. Many more plants are being constructed. A person needs only go to any Garden City grocery store or to the market gardener to see the variety and excellent quality of garden stuff produced. The small grains, alfalfa, Kafir and other forage crops grown this year under irrigation speak volumes, and can only be properly appreciated by seeing them in the fields.

The economy of water is of vital importance, and a subject I wish to emphasize. Pumping at a nominal expense, and saving the water—not allowing it to go to waste, means much to our people. It is distressing and costly to let water run from the ditches onto the highways, as I frequently saw it on a visit to Colorado last August. The judiciously economical use of water is one of the greatest problems in the irrigation districts. It is not enough that I or any man may say, "Well, I have plenty to irrigate my crop, even if I have wasted some water." We should consider the men below us or those who have not been so fortunate as to obtain all they needed, and whose crops might have been saved with what others wasted. The preparation of proper ditches, neither too large nor too small, is a great factor in saving water, and their dimensions should correspond with the area to be irrigated.

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THE SIGNIFICANCE OF "DRY FARMING."

By Alfred Atkinson, Vice President of the Dry Farming Congress, Bozeman, Mont., at the Board's Forty-first Annual Meeting.

Within the temperate zone production areas are usually classified on the amount of their annual precipitation. The custom has been to regard localities having an average annual precipitation of eighteen inches or over as humid, and adapted to general crop raising; between twelve and eighteen inches as semiarid, and fitted to grazing; and under twelve inches as arid, and unsuited for agricultural production. The American desert of a few years ago included the semiarid and arid areas of the western United States, especially the Rocky Mountain states. In this section great stretches of land which could not be irrigated remained unbroken by tillage machinery, and were utilized only in producing natural grasses for the maintenance of the range stock.

With the western movement of settlers during the last decade has come active demand for lands on which crops might be raised. To meet this demand for western lands it was found that the acreage being brought under irrigation was wholly insufficient. These settlers must farm the lands without irrigation or settle elsewhere. The successful crops occasionally raised by range farmers, coupled with the insufficiency of funds to transport the farmer and his family to other localities, in many instances encouraged in the first case, and made necessary in not a few cases, the attempt at crop raising on land not irrigated. This farmer did not irrigate, and was said to be farming it "dry." Thus we see that the term "dry farming" has been used from the beginning of nonirrigated crop raising on arid and semiarid lands in America.

Another condition which hastened the attempt at the cultivation of dry farm lands was the necessity of getting revenue from the lands for the development of the various western states. In some of these states the area of land that will permit of irrigation is relatively small, and if dry-farm homes can not be maintained the possibility of much income from the land resources is not great. Again, railroads and corporations having interests in these states were under the necessity of encouraging all lines of productiveness if the greatest possible income were to be assured. These necessities led to the establishment of experimental, and later of demonstration, farms. These have had a marked influence on the settlement of the lands and the success of the first settlers.

Turning to a consideration of the principles which underlie successful dry-farm crop raising, we realize at once that the question of moisture supply is the all-important one. The other essentials in growth—temperature, air and plant food—are at hand. The only weak place in the natural conditions is the moisture supply. Dry-farm tillage, therefore, is tillage to conserve and make available for growth the largest possible amount of the natural precipitation.

Throughout much of the dry-farming country the average annual pre-

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cipitation varies from twelve to twenty inches, with a normal mean of fourteen inches in many localities. The question of the sufficiency of this amount of moisture for crop production naturally presents itself, and has already come in for some careful study. Investigations by the Utah experiment station show that, after allowing for the straw, upwards of 1500 pounds of water are taken from the soil in the production of each pound of dry matter in wheat grain. One inch of precipitation over one acre furnishes 226,000 pounds. This is equivalent to two and one-half bushels of wheat, when all used for growth. If, now, the water furnished in fourteen inches precipitation could all be used a good crop of wheat could each year be raised. Because of unpreventable losses in evaporation, run-off after heavy rains, etc., all moisture which falls is not available for crop production, and the size of the crop harvested depends on the amount of loss which is prevented.

In plant growth water functions in a twofold manner. It is essential as the carrier of plant food up into the plant, as well as in keeping the plant cells in proper physical condition for growth, and is necessary, associated with air and proper temperature, in bringing plant food in the soil into an available state. In dry-land, as well as in humid agriculture, these demands must be met, and when crop failures are reported it indicates failure to make provision for supplying these essentials.

Results of five years' study of dry-farm moisture and nitrates at the Montana experiment station, as yet unpublished, show that the failure to provide adequate moisture for the soil occasionally during the summer months, in order that plant food may be made available, explains, in large measure, the small crops too frequently harvested. Dry land planted to spring wheat for four successive seasons returned but four bushels to the acre at the fourth harvest. Moisture and nitrate determinations during these seasons showed that while the moisture content was quite low, the amount of nitrate or available nitrogen was away below the place where strong growth could go on. Contiguous to this continuously cropped plot wheat was grown alternate years, with summer-tilled fallow between. This yielded upwards of thirty bushels per acre and commenced its growth in the presence of a large amount of available plant food each spring. The season of moisture-conserving tillage, with no crop demands, had made conditions favorable for the activity of plant-food organisms. The studies indicate that high returns can not be looked for on continuously cropped land, and suggest the necessity of a light moisture demand occasionally during the warm weather.

With reference to the tillage practices adapted, two essentials seem to stand out as being of especial importance. These are: proper and intelligent surface tillage where crops are not growing, and the packing of the furrow slice or seed bed to establish contact with the soil layers below.

The moisture efficiency of a surface mulch is generally recognized. This layer of dry loose earth interferes with the passage of water upwards, and so the loss of water which may be stored in layers below is prevented. The value of this possibility can not be overestimated in dry-land agriculture. The lower soil layers form the water reservoir in which moisture needed for growth is stored. The tendency of water so held is to

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move to the surface and evaporate, and if some practical method of preventing this rise were not at hand the supply could not be retained. The surface mulch stops the rise, and so acts as the dry farmers' moisture reservoir dam.

The particular conditions under which the surface mulch may be utilized naturally suggest themselves. In the case of spring plowing the land ought to be harrowed or disked down immediately following the plow. On fallows the mulch should be reëstablished after each rainy period. If this is not done moisture is very rapidly lost into the dry western atmosphere, and the fullest crop possibilities can not be realized.

The importance of prompt and careful attention to dry-farm fallows can not be overemphasized. When the land has been left uncropped for the purpose of fitting it for the next season's planting it can in large measure be insured against crop failure from drought. If the rain which falls is retained by having a mulch established as soon as the surface is dry enough, a large part of the season's precipitation may be retained and a fair crop practically assured for the succeeding year. Ample moisture retained in the fallows also means an abundance of available plant food to carry forward the coming crop. If dry farmers would, either in fallow or in intertilled crop land, carefully accumulate moisture in the soils on a part of their farm for the following season's crop, dry-land agriculture would soon cease to consist in gambling on abnormal rainfall the succeeding seasons.

The other tillage essential mentioned—the careful packing of the seed bed—ought to be regarded. The furrow slice is the germinating zone of the seeds planted, and it is here that the young roots form. If the seed bed is not packed down so that the moisture stored below may move up to the region of growth activity, the crop is poorly started and illy fitted to go forward in the vigorous way which is necessary. During dry weather the only source of water supply is from below. To get this to the growing crop there must be unbroken contact between the seed bed and the lower soil.

In the matter of crops especially suited to dry-land growth, experience has shown that, to succeed under the conditions, plants must be hardy growers, with strong root systems, and must mature early. Over much of the dry-farming country a large percentage of the year's precipitation comes during the months of April, May, June and early July, and the high-yielding crop is the one which is well along toward the ripening period when the rainy season concludes.

Of the particular crops, fall wheat, and more especially the Turkey Red variety, is one of the very best. It is grown over much of the western country and appears to be destined to hold a very important place. For the general introduction of this crop western farmers owe much to the state of Kansas.

As to methods of management, practices differ in localities, but seeding during the last ten days of August, at the rate of one bushel per acre, is very generally followed. The crop usually ripens by July 20, and yields ranging from twenty to forty bushels per acre are commonly harvested. Thirty-bushel yields on large tracts, after careful summer tillage, are quite common.

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Other grain crops grown are: Macaroni wheat, early-maturing oats, flax, hull-less barley, field peas, and corn. This last-named crop is rapidly growing in favor, and many of those best informed believe that corn will be generally used in place of the summer fallow.

As has been the case under so many conditions, we find alfalfa to be the friend of the dry farmer. When given good conditions at the time of planting, so that a strong root system is established, alfalfa gives one and sometimes a second cutting of hay. On the average, the yields harvested are from one and a half to two tons per acre. In many instances no second cutting is taken from the land, but instead this growth is pastured off by live stock. For furnishing high-quality hay to encourage the keeping of live stock, which is so essential on a permanently successful farm of any sort, as well as for the maintenance of the soil's nitrogen supply, alfalfa, the king of forage crops, is in truth the dry-farmer's friend.

In certain sections of the dry-farming country the raising of alfalfa seed is rapidy coming into prominence. The quality of this seed is high, and dry-land alfalfa seed ought soon to have very general recognition.

Aside from the tillage methods and crops to be used, the incoming dry farmer wants brief reference. As is the case with any new line of agricultural activity, frequent failures are recorded. Men take dry-farm homesteads, devote themselves to the work, and fail dismally. This is pathetic, but seems to be the price which must be paid by a certain percentage of the pioneers along any line.

The most casual review of conditions shows many reasons why these failures may be looked for. In the first place, the announcements of dry-farm cropping possibilities, which means the utilization for cropping of many millions of acres previously thought to be unfitted for such use, bordered on the sensational in many instances, and created in the minds of the uninitiated an incorrect opinion of dry-farming possibilities. The effect of this was to attract as dry-farm settlers many who were wholly without agricultural experience of any sort. Successful dry farming means very careful soil and crop management, intelligently done. That these men should proceed in the proper way was not to be expected, and so many failed.

Again, the essential demands of dry-land agriculture must be met, or failure is almost certain. In humid agriculture fair crops are often raised with very careless methods. No essential growth condition is absent in any serious degree, and a certain amount of crop is returned. In dry-land agriculture the tillage must conserve the water and hold it until needed by the growing crop. If this is not done necessary moisture is almost sure to be absent, and crop returns are not possible.

Honest differences of opinion have been expressed relative to the wisdom of substituting some less suggestive name for this new western agriculture. The contention is that the term dry farming scares prospective settlers, and the "dry" ought not to be included. While there may be merit in this, yet it is well to have the incoming settler realize that he is undertaking a line of agricultural activity which is not easy, and if success is to be his reward, the price is thorough and timely effort, wisely directed. He must reliably inform himself on the essentials of dry-land agriculture, and then be guided by his information. As stated in a preceding para-

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graph, dry farming is not gambling on abnormal rainfall for the coming season, but it is so insuring the coming year's crop, by storing moisture in a portion of the land, that a good crop may be raised with normal precipitation.

In conclusion, a word might be added on the general effect of the development of dry farming on humid agriculture. From time to time crop yields considerably below the average are harvested on account of drought. During the past season there was crop shortage in some localities on this account, and yet the amount of the precipitation was such as to make highy favorable cropping conditions, if furnished in the dry-farming areas of the West. Furthermore, evaporation is higher in the West, and so the natural loss in this way is greater. The difference comes in the tillage methods used, and suggests the wisdom of introducing some of the western tillage methods into humid agricultural practice. If prompt spring tillage were given in the cornfields of the Central West, so that the spring moisture present could be retained for use later, much of the loss from drought could be prevented. The moisture too frequently lost during April would be worth much during July and August. A surface mulch established as soon as the ground is dry enough in the spring, and reestablished after each rainy period, would hold this moisture for the crop. Dry-land agriculture has shown some of the possibilities along these lines.

DOES IT PAY TO INTRODUCE OR IMPORT SEED WHEAT?

By W. M. JARDINE, Professor of Agronomy, Kansas State Agricultural College, Manhattan, at the Board's Fortieth Annual Meeting.

This is a question farmers, wheat dealers and millers have been asking themselves for many years. It is a question concerning which there is still much diversity of opinion. While the practice of interchanging seed wheat is not general among wheat growers, there nevertheless is a great deal of seed planted every year that has been brought in from outside districts, at a cost to the farmer considerably higher than seed of the same variety could have been secured at home. In addition to paying a premium on introduced seed there is always danger of introducing with the wheat seeds of obnoxious weeds or weeds that sooner or later will become obnoxious. Unless it can be shown, therefore, that larger yields of wheat or a better quality of wheat, or both, can be obtained as a result of interchanging seed wheat, the practice should be abandoned.

At the present time there is an apparent feeling among the farmers, wheat dealers and millers of the state of Kansas, that our hard winter wheats are deteriorating in milling quality; that they are becoming more starchy, and consequently softer. It is argued that wheat will gradually "run out" if continuously grown from the same seed in one locality for any length of time, and that in order to maintain high quality and productive power in our hard winter wheats it will be necessary to introduce new seed from time to time.

A few years ago this same general feeling regarding the quality and yield of the hard winter wheats of Nebraska prevailed among the farmers, grain dealers and millers of that state, where the Turkey and

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Kharkof varieties are extensively grown. They, too, feared their wheat was deteriorating in yield and quality as a result of planting home-grown seed continuously in the same locality for a period of years. Investigations were at once begun by the Nebraska experiment station to determine the cause of the yellowish kernels, called "yellow berry," which usually occurred in a greater or lesser degree, and which was thought to be one of the bad results obtaining from continuously planting home-grown seed, and also to determine what effect the changing of seed would have upon the quality and yielding power of wheat. Investigations were directed along the following lines:

To determine whether the yellow berries were due to bleaching by the sun and other weather conditions after harvest.

To determine the influence of time of cutting upon the amount of "yellow berry."

To determine if the character of the season, independent of any method of handling the crop, might influence the amount of "yellow berry."

In the interchanging of seed, wheat was brought from Kansas, Iowa and Ohio and grown at the Nebraska experiment station alongside of home-grown seed of the same variety. Also, through the United States Department of Agriculture, seed was obtained from a shipment of six varieties of hard red winter wheat from Russia and grown alongside of similar home-grown varieties at the Nebraska experiment station.

* As a result of these investigations, which extended over a period of years, Dr. T. L. Lyon and Mr. Alvin Keyser, under whose direction the investigations were conducted, arrived at the following conclusions:

"'Yellow berry' in hard winter wheat causes an annual loss to the wheat raisers of Nebraska of from one-half to one million dollars. The chief cause of this condition is allowing wheat to become overripe and failure to stack the sheaves.

"Yellow berries, as compared with hard red ones, have a lower gluten content and are lighter in weight.

"Seed wheat brought from a distance did not in any case prove as good as the local-grown seed of the same variety. Locally grown Turkey Red yielded better than imported Crimean for each of the years tested. (Crimean is practically identical with Turkey Red.)

"Turkey Red wheat brought from western Kansas (the Fort Hays substation) yielded nearly as well as the Nebraska-grown seed, and was of better quality during the drier years, but suffered more from scab or blight in 1903 and 1904."

They also found that Turkey Red wheat was the best adapted on the whole for growing in the state of Nebraska, and that there is quite a definite relation between the per cent of "yellow berry" in the crop and the character of the season in so far as the latter affects the date of ripening, the composition and the yield of wheat. The amount of "yellow berry" increased with the lateness of ripening, and crops of large yield and low nitrogen content contain more yellow berries than do crops of low yield and high nitrogen.

Other investigators, both in this country and abroad, have found that the protein content of the wheat berry varies with the length of the

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* Nebraska Experiment Station Bulletin No. 89.

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fruiting period, that is, from the time of blossoming until ripe. The longer the fruiting period the lower the per cent of nitrogen.

In 1905 the office of grain investigations of the United States Department of Agriculture began some coöperative experiments with the states of South Dakota, Kansas and California and in Texas, to determine what effect seed of the same variety of wheat grown at these different points and then interchanged between these different points would have upon the composition and yield of the product obtained in each respective locality. The writer, being a member of the office of grain investigations during the time these experiments were running, took occasion to study the results very carefully, and here presents such of them as are germaine to the question in hand.

EXPERIMENTS.

The experiments consisted in growing winter wheat from the same original seed in each of three dissimilar localities, each typical of its own district: Hays, Kan., *Amarillo, Tex., and Yuba City, Cal. Samples of grain from each year's crop were sent to the other points and there grown alongside of the continuously home-grown seed. Three plots of wheat were, therefore, grown at each station, and all from the same original seed.

Influence of Climate and Seed upon the Protein Content of Wheat.

By this method of interchanging seed it was possible to determine the influence of climate and of seed upon the crop produced. Crimean, a common hard red winter wheat, similar to Turkey, was used in these tests, seed of which was obtained from the 1905 crop of wheat grown at Hays, Kan. Seed was sent from this point to California and to Texas to plant one-tenth acre plots, and a one-tenth acre plot was also planted at Hays, Kan. The crop grown in 1906 at each of the three points in question forms the real starting point of the experiment. Three years' results from these experiments are shown in the following tables:

It will be observed from table No. I that the original seed, from which the crop of 1906 was grown, contained 14.53 per cent protein, was 98 per cent flinty and weighed 56.5 pounds per bushel. The grain from the 1906 crop contained 17.23 per cent protein in Kansas, 9.8 per cent in California, and 10.88 per cent in Texas; that grown in Kansas being 100 per cent flinty and weighing 58.8 pounds per bushel, while that grown in California was only 36 per cent flinty—almost entirely "yellow berry"—and weighed 59.4 pounds per bushel.

Grain from the 1907 crop grown from seed distributed from each station to each of the other two stations, that is to say, when the Kansas, California and Texas grown seed was planted in Texas, although it varied in protein from 9.8 to 17.27 per cent, and in flintiness from 36 to 100 per cent, produced grain of practically identically the same protein content, and equal in flintiness and in weight per bushel. Also, the same seed when planted in California, even though it varied in protein, as just shown, produced grain almost the same in protein content, flintiness and weight per bushel. Likewise the same seed planted at Hays, Kan., pro-

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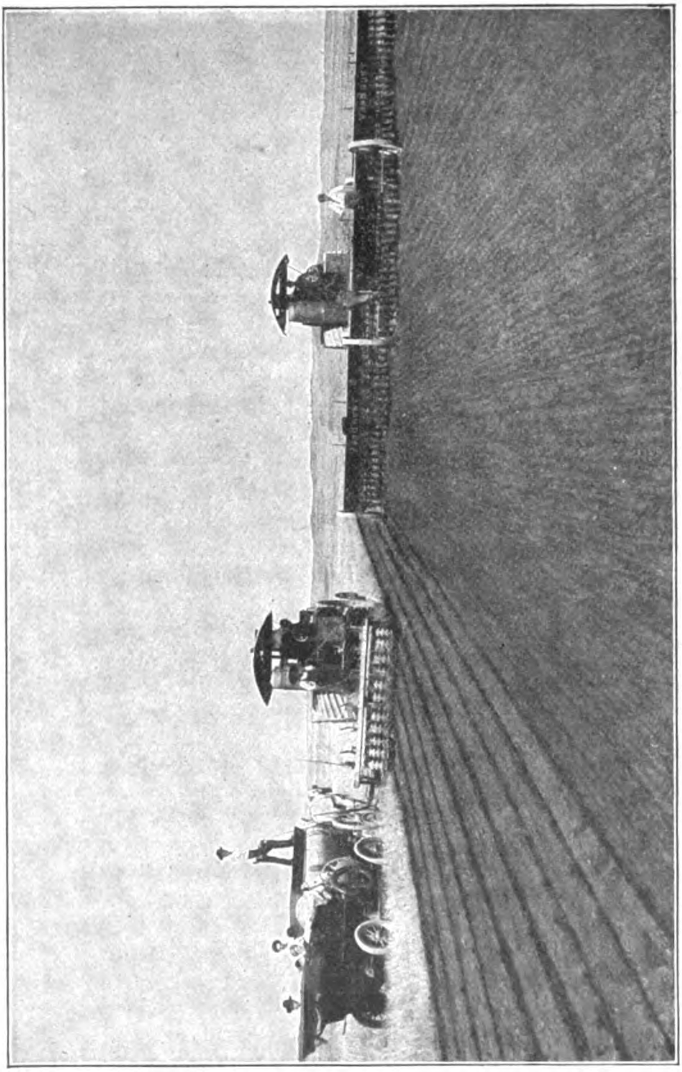
* The Amarillo, Texas, station is a government station operated under the direction of the office of grain investigations.

duced grain containing practically the same percentages of protein and weight per bushel. Similar results were obtained from these experiments in 1908, as indicated in the table.

Similar experiments were conducted between the following points with a spring wheat, Kubanka, a durum; Highmore, S. Dak., Hays, Kan., and Yuba City, Cal. The seed from which the original 1906 plantings were made was grown at Highmore, S. Dak., in 1905. The results shown in table No. II are almost identical with those obtained with winter wheat. That is to say, no matter what the variation in composition of the seed, with respect to protein content or "yellow berry," all the grain produced therefrom at each respective point was practically identical with respect to these two properties.

TABLE No. I. *Exchange of seed experiment—winter wheat. (Kansas, Texas and California.)*

SOURCE OF SEED.	Protein.	Flinty.	Weight per bu.	Yield.
Original from Kansas, '05	14.53%	98%	56.5%	
1906.				
Kansas, '05, to Kansas, '06	17.27	100	58.8	
Kansas, '05, to California, '06	9.80	36	59.4	
Kansas, '05, to Texas, '06	10.88	....	58.9	
1907.				
Texas, '06, to Texas, '07	16 47	95	58.6	12.00
Kansas, '06, to Texas, '07	15.33	98	58.5	10.68
California, '06, to Texas, '07	16.47	....	57.3	8.32
Texas, '06, to California, '07	10.26	50	62.3	
California, '06, to California, '07	10.26	60	61.8	
Kansas, '06, to California, '07	9.91	50	61.3	
Kansas, '06, to Kansas, '07	20.23	....	51.3	
California, '06, to Kansas, '07	20.74	....	51.3	
Texas, '06, to Kansas, '07	20.46	....	50.7	
1908.				
Kansas, '07, to Kansas, '08	13.11	60	58.2	
California, '07, to Kansas, '08	......	....	....	
Texas, '06, to Kansas, '08	13.39	75	58.1	
Texas, '07, to California, '08	11.40	....	60.2	31.2
California, '07, to California, '08	10.71	....	61.4	39.3
Kansas, '07, to California, '08	10.48	....	61.7	38.8
Kansas, '07, to Texas, '08	Lost.			
Texas, '07, to Texas, '08	Lost.			
California, '07, to Texas, '08	Lost.			



Disk drills operated by a tractor motor.

Effect upon Yield from Interchanging Seed.

In addition to the grain produced from home-grown seed being equal in protein content, weight per bushel and flintiness or freedom from "yellow berry" to that grown from introduced seed, it also gave as large, and usually larger, yields of grain per acre, as the figures in tables I and II show, wherever the yield is recorded. For example, in 1907, when Crimean winter wheat grown in California and in Kansas was planted alongside of Texas-grown Crimean in Texas, the yields were as follows: 8.32 bushels per acre from California seed, 10.68 bushels per acre from Kansas-grown seed, and 12 bushels per acre from Texas-grown seed—a difference of 1⅓ to 3⅔ bushels per acre that year in favor of home-grown seed.

TABLE NO. II. *Exchange of seed experiment—spring wheat. (South Dakota, Kansas, California.)*

SOURCE OF SEED.	Protein.	Flinty.	Weight per bu.	Yield.
Original from South Dakota, 1905....	11.74%	70%	62.8%	
1906.				
South Dakota, to South Dakota, '06...	12.88	70	61.3	
South Dakota, '05, to Kansas, '06.....	17.90	100	56.8	
South Dakota, '05, to California, '06...	8.78	13	60.0	
1907.				
California, '06, to California, '07......	8.95	29	62.0	
South Dakota, '06, to California, '07...	8.15	12	61.5	
Kansas, '06, to California, '07........	8.79	22	61.8	
South Dakota, '06, to South Dakota, '07,	11.57	88	63.7	20.16
Kansas, '06, to South Dakota, '07.....	12.77	99	62.2	15.16
California, '06, to South Dakota, '07...	12.48	98	63.0	18.83
Kansas, '06, to Kansas, '07...........	Lost.			
South Dakota, '06, to Kansas, '07.....	Lost.			
California, '06, to Kansas, '07........	Lost.			
1908.				
Kansas, '07, to California, '08.........	14.59*	100	60.0	22.3
California, '07, to California, '08‡.....	13.45	100	61.5	22.3
South Dakota, '07, to California, '08...	13.97	100	......	22.6
South Dakota, '07, to Kansas, '08.....	13.51†	98	53.8	
Kansas, '07, to Kansas, '08...........	13.34	100	57.8	
California, '07, to Kansas, '08........	13.11	96	55.2	
South Dakota, '07, to South Dakota, '08,	14.82	100	60.2	24.50
Kansas, '07, to South Dakota, '08.....	15.56	100	59.0	18.83
California, '07, to South Dakota, '08...	14.99	100	57.8	19.50

* The season of 1908 in California was unusually dry, the seasonal rainfall being 9 inches compared with 20 inches in 1907.

† It was unusually wet in Kansas in 1908, the seasonal rainfall being 11 inches compared with 5.5 inches in 1906.

‡ Very little moisture that year compared to previous years, hence the flintiness.

Likewise, Kubanka, grown at Highmore, S. Dak., the same year (1907), from Kansas seed, from California seed, and from home-grown seed, gave the following yields per acre: From Kansas seed, 15.16 bushels; from California seed, 18.83 bushels; from home-grown seed, 20.6 bushels—a difference in favor of home-grown seed of from 1.77 to 5.44 bushels.

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Conclusions from Results of the Experiments.

It is safe to conclude: (1) That seed of low protein content, or practically all "yellow berry," if otherwise strong and viable, will produce grain equal in quality, both with respect to per cent protein and flintiness, to that produced from introduced seed of the same variety rich in protein, providing they are of equal breeding. (2) That "yellow berry" seed will produce grain equal in quality to grain grown in the same locality from seed free from "yellow berry." (3) That home-grown seed will usually produce larger yields than introduced seed of the same variety of equal breeding.

These conclusions are in line with what other investigators have found to be true; they are also in line with what the writer has found to be true as a result of planting Canada-grown Turkey seed wheat at Nephi, Utah, and at Bellefourche, S. Dak., alongside of home-grown Turkey.

INFLUENCE OF SOIL UPON THE PROTEIN CONTENT OF WHEAT.

Thatcher, of the Washington state experiment station, found that the character of the soil influences but slightly the protein content of wheat. He transferred soil from one section of the state to another in order to grow the same variety of wheat under the same climatic conditions but on different types of soil, and soil representing different sections of the state where the amount of protein produced in the wheats thereof varied considerably. He was anxious to determine if the cause of this fluctuation in the amount of protein in the same variety, when grown in different parts of the state, was due to climatic factors or to the soil. He was unable to obtain any appreciable difference in protein content from the grain grown on unlike soils in the same climate. Lyons, in his historical summary of the investigations of the conditions affecting the composition of wheat, published in volume I of the American Society of Agronomy, concluded that the character of soil has very little to do with the composition of the wheat kernel.

The office of grain investigations of the United States Department of Agriculture is now conducting an experiment in coöperation with the states of California, Kansas and Maryland, in which large bodies of soil have been exchanged between these points and placed back in the ground in a condition as nearly like their original state as possible. Two years' results have been obtained from Kansas and California soils alongside of Maryland soils, in Maryland; Maryland and Kansas soils alongside of California soils, in California; and California and Maryland soils alongside of Kansas soils, in Kansas. Shaw states that no appreciable difference in the composition of the wheat produced has been obtained in California, and I have been indirectly informed that the same has been found true of the crops grown at each of the other points for the two years in which these trials have been in progress.

From the abundance of material at hand, it is safe to conclude that the soil influences but slightly the protein content of the wheat kernel, and that fluctuations in protein content of wheat, in so far as they affect the length of the fruiting period and yield, must be due to climatic conditions.

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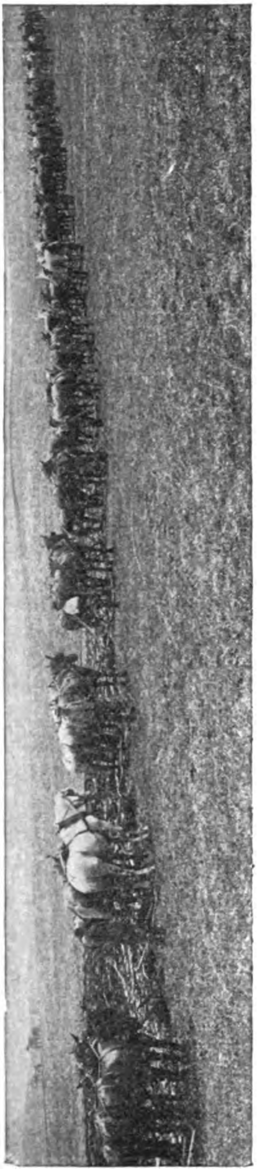
GENERAL CONCLUSIONS AND RECOMMENDATIONS.

Inasmuch as it has been clearly shown by experimentation that climatic conditions, such as moisture, temperature, etc., especially during the fruiting period, are largely responsible for the fluctuations occurring in the composition of wheat, especially with respect to protein content, "yellow berry" or starchiness, and inasmuch as quality in wheat does not "run out" as a result of growing wheat continuously in the same locality from home-grown seed, and inasmuch as imported seed has failed to produce better quality grain or larger yields than have been produced from home-grown seed of the same variety and of equal breeding, it would seem that the practice of interchanging or importing seed wheat is a useless and expensive practice after the best possible variety has once been obtained for a locality. Kansas has such a variety in the Turkey Red and Kharkof winter wheats. Their supremacy has been demonstrated many times in comparative tests carried on with varieties from all over the world on Kansas soil and under the climatic conditions existing here.



Showing the number of teams, plows and men required to do the same work as an engine and ten-plow gang.

While "yellow berry" does occur in the hard red winter wheat of this state, we must look for some other means of eliminating it than through the importing of seed. In the writer's opinion it will be necessary to breed up a variety in Kansas that will be resistant to "yellow berry," if such a thing be possible. It is also the writer's opinion that Kansas is the place to breed up our wheats in order to increase our yields.

The points which I have attempted to bring out in this paper refer only to the interchange or introduction of seed of the same variety and not to any discussion of the relative merits of different varieties for different localities. The writer does not wish to be understood as stating that any definite stereotyped rule can be laid down in regard to the interchange of seed wheat between different localities, for there will always be instances where it will be desirable to bring seed from outside districts to replace home-grown seed of the same variety that has become foul with weeds and mixed with other varieties through careless methods of farming. Such instances, however, should be the exception rather than the rule, once the best is secured for a district.

Every wheat grower of Kansas should see to it that his seed is kept pure and free from all inferior varieties, because it is partly through the use of a mixture of varieties of wheat for seed—among which there can be only one best variety for a particular district—that our average acre yield of wheat is only fourteen bushels.

Farmers who wish to improve the quality and yield of their wheat are advised, first, to secure the best possible variety in yield and quality for their respective localities; and, second, to plant home-grown seed that has been carefully selected and cleaned. If these two suggestions are carried out there will be little doubt (1) that the quality of Kansas wheat will be much improved and that more of our farmers will be securing the top market prices for their wheat, in place of second-grade prices as is too frequently the case to-day; and (2) that the yield of wheat per acre would be substantially increased as a result of eliminating inferior varieties and purifying the best ones.

HOW TO GROW ALFALFA.

From Circular No. 36, Indiana Experiment Station, by A. T. Wiancko and M. L. Fisher.

Alfalfa may be successfully raised on almost any type of soil, provided that it is well drained, sweet, free of weeds, and well supplied with organic matter and mineral plant food.

Good drainage must be provided.

The ground must be free of weed seeds.

If the soil is sour, it must be limed before alfalfa can do well.

Soils lacking in fertility should be well manured, as alfalfa requires large amounts of plant food.

Inoculation of the soil will generally be necessary and must not be neglected. Soil from a good alfalfa field or from a place where sweet clover is growing should be used for inoculating.

The best land on the farm should be used for the first trial of alfalfa. If successful, it will pay better than any other crop.

Alfalfa is an excellent feed for all kinds of live stock.

It is rich in flesh-forming and milk-producing nutrients.

It is more digestible than red clover and is not far behind such materials as wheat bran in feeding value.

Alfalfa will yield from three to six tons of hay per acre per season, according to the fertility of the soil.

INTRODUCTION.

There is now no longer any doubt concerning the adaptation of alfalfa to Indiana conditions. Its high feeding value and its ability to produce large yields are established facts. Many farmers in various parts of the state are successfully producing large areas of it, and their experience

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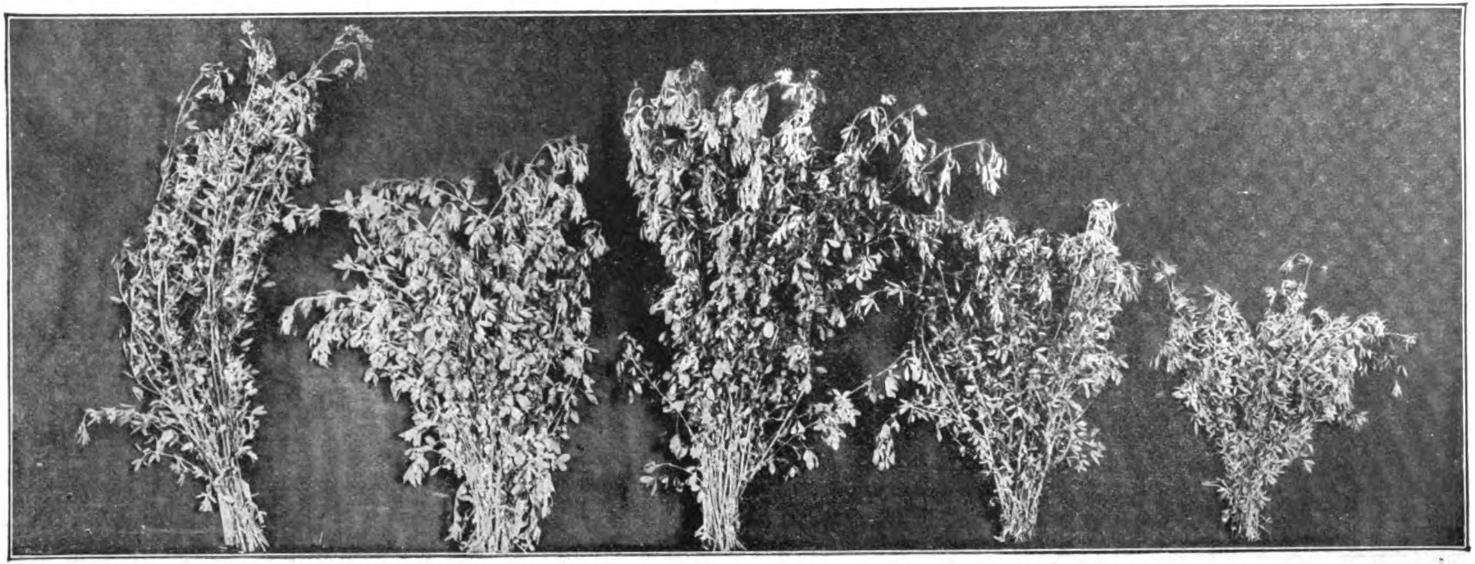

Five different types of alfalfa in the same field.

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and the experiments of this station, which have extended to practically every county, have shown that its successful production is simply a matter of understanding its requirements. In every neighborhood the interest in its production is becoming more and more marked and the time is not far distant when this valuable forage crop will play an important part in Indiana agriculture.

As with all crops that are new to the farmer or to the local conditions, there is much to be learned about alfalfa before it can be successfully produced. The nature of the plant must be carefully considered and its habits of growth, its needs in the way of plant food, the soils best suited to it, and its cultural requirements must be understood. Without such knowledge much disappointment is likely to result, and no one should attempt to raise alfalfa without first making a thorough study of the subject. When once understood alfalfa is easily produced, and the large profits that may be secured from it make it well worth while to devote some study to its requirements.

Recognizing the value of the crop and its possibilities for better agriculture, this station began experiments with it in 1903 with the purpose of finding out its cultural requirements. In recent years these experiments have been conducted in large numbers throughout the state, on all the principal soil types and in practically every county. As a result of these investigations, there has been collected a large amount of valuable information concerning the requirements of alfalfa, its behavior under different surroundings, and the best methods of dealing with it.

During the past year the experiences of nearly 300 successful alfalfa growers, representing all parts of the state, have been collected and carefully studied and much has been added to our knowledge of the causes of success or failure, and we are more than ever convinced of the large possibilities of the crop in Indiana.

Nearly every county has its alfalfa growers and in some counties it has become a common crop. Many farmers have considerable areas of it and are finding it by far the most profitable crop on the farm.

In the following pages the principal points which need to be considered and the methods of dealing with them are briefly discussed. All of these points are important and should be carefully studied.

FEEDING VALUE OF ALFALFA.

As a food for all kinds of live stock alfalfa is the king of forage crops. It is especially rich in protein and is well adapted for use in a feeding ration with corn which is relatively low in protein content. It makes excellent hay and is more digestible than most forms of rough feed. Numerous feeding trials with alfalfa have shown that it is worth fully a half more than clover hay and many feeders claim that it is almost equal to such materials as wheat bran.

At the Illinois Experiment Station* a test of the value of alfalfa as compared with timothy for dairy cows showed that a ration composed of mixed grain, corn stover and alfalfa hay produced 834 pounds more milk per ton of hay fed than a ration in which an equal amount of timothy hay was used instead of the alfalfa. The milk produced during this test was

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* Illinois Bulletin No. 146.

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sold at $1.30 per 100 pounds, which made a ton of alfalfa hay worth $10.86 more than a ton of timothy hay. In another test where an equal amount of alfalfa hay was substituted for bran in a ration otherwise composed of clover hay, corn silage and corn meal, the ration containing alfalfa produced more milk but slightly less butter fat than the ration containing bran, showing alfalfa hay to be equal to or a little better than bran for milk production when used in this way. At the Nebraska Experiment Station* the average of three feeding trials with steers showed that the cost of 100 pounds gain was $8.32 on a ration of corn and prairie hay and only $6.29 on a ration of corn and alfalfa hay.

As a pasture and soiling crop it has few if any equals, and one of the qualities which recommend it most highly is its rapid growth. For soiling purposes it can be cut four or five times in a season and for hay it will usually yield three good crops in Indiana, and sometimes four. As a pasture for hogs it is unexcelled. It is not only good feed, but helps to keep the animals in a healthy, vigorous condition. It also makes excellent pasture for cattle, sheep and horses.

TABLE I.—*Total pounds of Dry Matter and Digestible Nutrients in 100 pounds of Alfalfa, Red Clover, Timothy, Wheat Bran, and Corn.*

Compiled from Henry's "Feeds and Feeding."

FEEDS.	Total dry matter.	Digestible protein.	Digestible carbohydrates.	Digestible fat.
Alfalfa hay	91.6	11.0	39.6	1.2
Red clover hay	84.7	6.8	35.8	1.7
Cowpea hay	89.3	10.8	38.6	1.1
Timothy hay	86.8	2.8	43.4	1.4
Wheat bran	87.7	12.3	37.1	2.6
Cottonseed meal	91.8	37.2	16.9	12.2
Corn (grain)	89.4	7.8	66.7	4.3

SOILS FOR ALFALFA.

Many people make the fatal mistake of expecting alfalfa to do well on soils that are not fit properly to produce any kind of a crop. There is just as much need of care in selecting and preparing soils for alfalfa as for any other crop, and probably more, because of its deep rooting habits and large plant-food requirements.

Deep, loamy soils with open subsoils are undoubtedly best for alfalfa, but there is plenty of evidence to show that it may be successfully produced on almost any type of soil, from light sandy or gravelly loams and peats or mucks to heavy clays, provided that it is well drained, sweet, and properly supplied with organic matter and available plant food. In 348 trials conducted by this station in recent years in coöperation with farmers throughout the state, 68 out of 83 clays, 167 out of 188 loams, and 69 out of 77 sandy soils gave satisfactory results. Failures seemed to be due to factors other than the type of soil.

Many soils that at present are not fit for alfalfa culture may be made so by providing drainage facilities, correcting acidity, adding organic matter, or supplying needed plant food, according to the requirements.

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* Nebraska Bulletin No. 100.

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Single alfalfa plants, showing nodules on roots. These were secured May 23 from a field seeded August 17 the preceding year.

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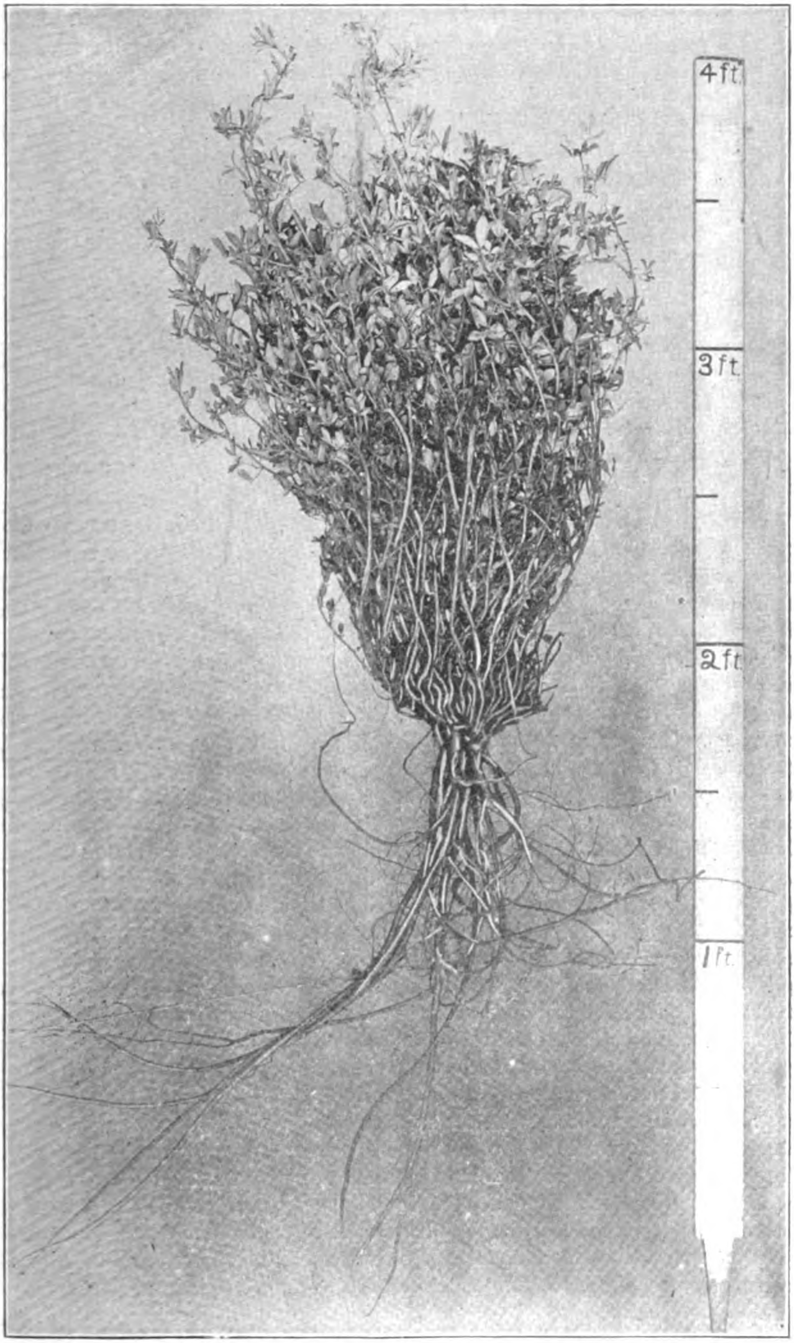

A fully developed alfalfa plant.

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Good drainage is essential in order that the roots may go deep into the soil. Hardpan must be broken up or avoided altogether. Soils that are sour may be made sweet by thorough drainage and the application of lime. A good supply of decomposable organic matter in the soil helps the bacterial action in making plant food available, facilitates the inoculating process, and together with good drainage prevents heaving in the spring. For soils that are out of condition in this respect, a good way to supply organic matter if sufficient manure is not available is to raise and plow under a crop of cowpeas or some other green manuring crop before attempting to grow alfalfa.

Peat and muck soils may be used for alfalfa if they are well drained and properly supplied with mineral plant food. Potash is nearly always lacking in these soils and often phosphoric acid and lime must also be supplied. Soils that are subject to flooding are not good for alfalfa.

It is strongly recommended that the beginner in alfalfa culture put the crop on a piece of his best land. He can experiment with it later when he knows more about it.

SOIL FERTILIZATION.

Alfalfa requires large quantities of plant food and can not be expected to do well on poor soils. Its deep rooting habits may enable it to extract more food from the soil than most other crops, but to secure large yields there must be an abundance of food within easy reach, and if the soil is not naturally well supplied, manure or commercial fertilizer must be added. After it is thoroughly established and properly inoculated with its nitrogen-gathering bacteria alfalfa will supply itself with nitrogen from the air, but all potash, phosphoric acid, and other mineral food must come from the soil, and as the crop is naturally a large producer, large quantities are required. Of the plant food that must come from the soil, potash and phosphoric acid are most largely required, and these are the two substances in which the soil is most likely to be deficient. Every ton of alfalfa hay which is removed from the land takes with it about 11 pounds of phosphoric acid and 40 pounds of potash.

Every alfalfa field should be started with a liberal dressing of stable manure, if possible. Experiments have proven time and again that manure is unusually valuable in starting alfalfa. It not only supplies plant food but also improves the physical condition of the soil and facilitates the inoculating process. In many of the experiments conducted by this station, special inoculation of the soil was found unnecessary when plenty of manure was applied.

When sufficient manure is not available and the soil is not already rich and well supplied with organic matter, a crop of cowpeas or some other green manuring crop should be grown and plowed under and a high grade commercial fertilizer applied. Just what kind of a fertilizer will be required will depend upon the character and condition of the soil. In most instances, however, it will be well to use a fertilizer rich in both phosphoric acid and potash. A mixture containing perhaps a little nitrogen, and eight to ten per cent of phosphoric acid and the same of potash, applied at the rate of three or four hundred pounds per acre will

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be sufficient unless the soil is quite poor, in which case heavier application may be profitable. The fertilizer should be disked into the ground some time in advance of seeding.

LIMING SOILS FOR ALFALFA.

To what extent Indiana soils are in need of liming in order to produce alfalfa successfully is not definitely known. It is known, however, that alfalfa will not thrive in soils that are sour and that there are many such in the state. In some of the experiments conducted during the last few years liming has been found to increase the yield of alfalfa, while in other cases the lime produced no apparent effect.

Soils that produce good crops of clover will probably not be seriously in need of liming for alfalfa. On the other hand, where there is trouble in getting a stand of clover, or where this crop does not otherwise succeed well, it will usually pay to lime the soil, and liming may be actually necessary before alfalfa will do well, because the alfalfa bacteria will not thrive in acid soils.

In the case of soils that are sour because of lack of drainage, liming alone will not be sufficient. Drainage must receive first attention. The soil must also be otherwise put into good physical condition by proper tillage methods, the addition of organic matter, etc. After these things have been attended to, if the soil is in need of lime this substance can do its work properly.

The most satisfactory method of determining whether or not a soil is in need of liming is to make a small trial application of lime on a patch sown with alfalfa some time before seeding the whole field. Such an experiment may result in saving the expense of liming and is well worth making where there is serious doubt, because in many instances there is a sufficient natural supply of lime in the soil. In some portions of the state where there is an abundance of limestone, the soils may, nevertheless, respond to applications of lime because they bear no direct relation to the rock upon which they rest.

Where liming is necessary, an application of ground limestone will usually be most economical, although other forms of lime will give equally good results. The amount that should be applied will depend upon the needs of the soil, but probably not less than two tons of ground limestone per acre should be used, and double this amount may be necessary to secure the best results. It may be applied at any time, but the longer before sowing the alfalfa the better. It is a good plan to begin preparing the ground for alfalfa a year or so in advance, and in that case the lime may be applied when preparing the soil for the preceding crop. If the ground for alfalfa is to be plowed in the fall, the lime may be applied at that time. In spring preparation, the lime should be applied immediately after plowing and disked into the soil so as to give it as much time as possible to act before seeding.

INOCULATION.

Alfalfa, like all other legumes, requires for its proper development certain species of bacteria which work upon its roots and gather nitrogen for it from the atmosphere. If these bacteria are not present, the alfalfa will have to depend for its nitrogen upon the supply in the soil, which is

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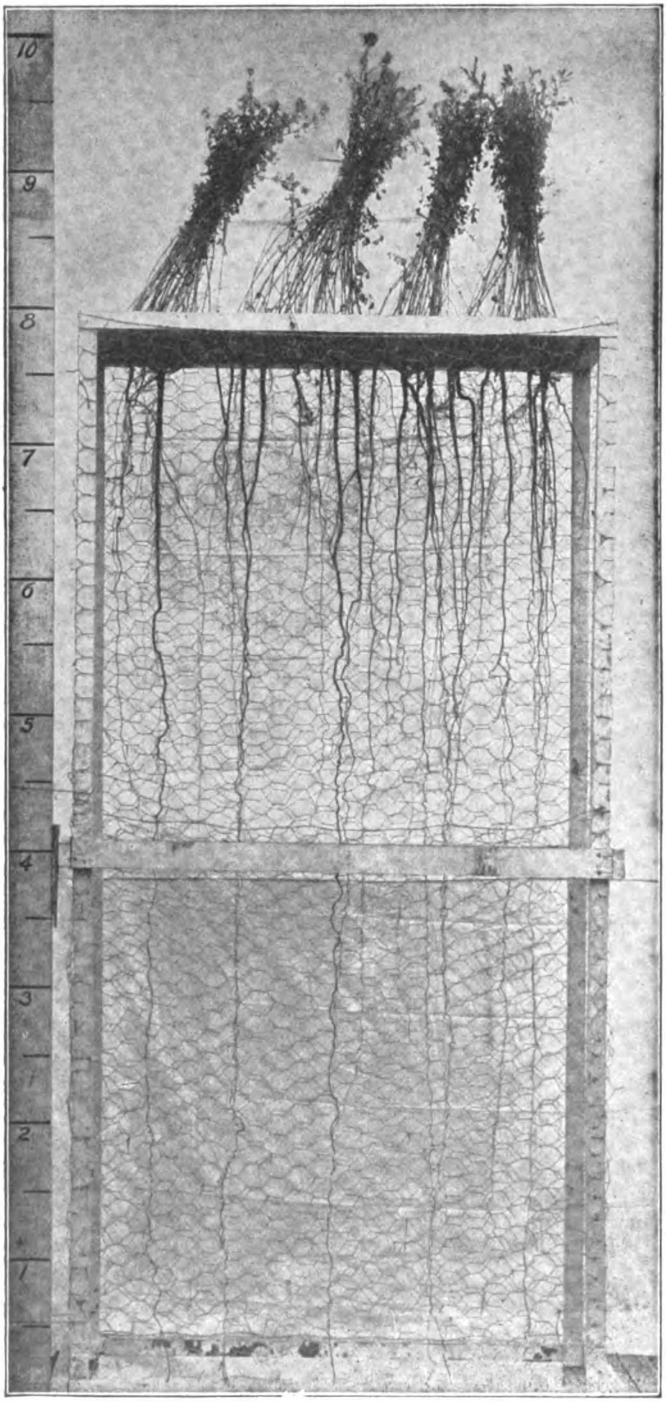

Alfalfa roots from a five-year-old field.
These penetrated over eight feet through clayey subsoil.

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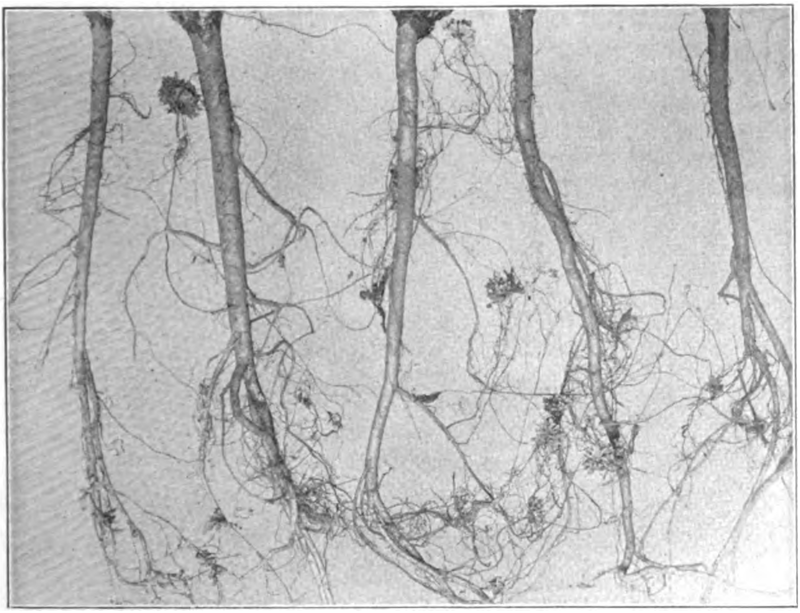
usually not sufficient to insure a thrifty growth. To get the most out of the alfalfa crop, and, in fact, before it can make its best development, the roots must be inoculated with the proper nodule-forming, nitrogen-gathering bacteria. In the majority of cases where alfalfa is sown for the first time, it will need to be inoculated by some artificial means. The surest and most practical way to do this is to broadcast and harrow in, before sowing the seed, some earth from a good alfalfa field where the bacteria are known to exist. At least two or three hundred pounds of soil per acre should be used. In securing this soil, care should be taken to secure it from a clean, healthy field so as to avoid the introduction of weed seeds or plant diseases. Care must be exercised, also, to guard against exposing the soil for inoculating to sunlight for too long a time before sowing and harrowing it in, as such exposure is detrimental to the bacteria. Inoculation may also be effected by mixing and drilling in with the alfalfa seed a small quantity of soil rich in bacteria, but the success of this method is not fully established.

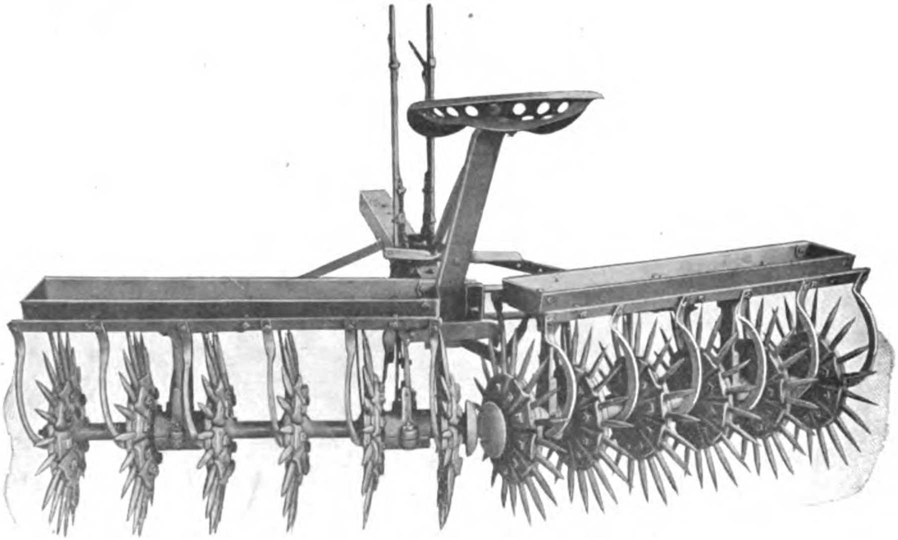


Young alfalfa roots showing the characteristic nodules of the nitrogen-gathering bacteria.

When soil from an old alfalfa field is not available, soil from a place where sweet clover is growing may be used for inoculating. In this case the surface should be first scraped off to avoid transferring sweet clover seed. The use of pure cultures of alfalfa bacteria has not been generally satisfactory, and probably because, with present methods, the bacteria are either dead before they reach the farmer or he is not sufficiently careful in their application. Some farmers are successfully inoculating their soil for alfalfa by sowing some alfalfa seed with clover a year or two before sowing alfalfa alone. Where there is any doubt, the safest plan is to inoculate.

THE TIME TO SOW ALFALFA.

If the weather conditions are favorable and the soil is in good condition and free from weed seeds, it does not seem to make any important difference when the seed is sown so long as there is sufficient time for the young plants to establish themselves thoroughly before winter, and good results may be secured at any time from April to August. Trouble with weeds is most likely to arise with the earlier seeding, while with the later seeding there is liable to be an insufficient supply of moisture in the soil to permit of proper soil preparation, and the germination of the seed and the development of the plants may be seriously delayed by periods of drought. In the experiment station's trials with late summer seeding during the last six years, periods of drought have been occasionally encountered in different parts of the state, which have more or less seriously interfered with getting a satisfactory stand or a sufficient amount of growth before winter. To insure success, therefore, it seems wisest not to delay seeding beyond the first of August in the northern counties and the fifteenth of August in the southern portion of the state. Seedings made in April or May, on the other hand, are so liable to be troubled with weeds that such early seeding is not advisable, even with the use of a nurse crop, unless the ground is known to be free of weed seeds. On this point we would especially caution farmers, as few realize how full of weed seeds the soil really is.



An alfalfa spike-tooth disk harrow.

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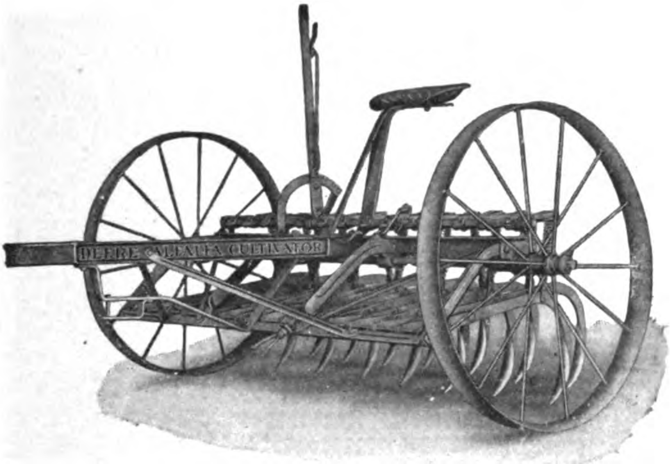
KILLING WEEDS.

Trouble with weeds has caused more alfalfa failures than any other one thing. On account of the danger of trouble with weeds in spring seeding and the liability of interference by drought in late summer seeding, it is undoubtedly safest and best, say in Indiana, to spend the spring in ridding the ground of weed seeds and then sow the alfalfa alone about the end of June or the early part of July. In this case the ground should be plowed in the spring, turning under some manure, if possible, and then harrowed every 10 days or two weeks until seeding time. Each successive harrowing will kill the weeds that have started and put a fresh lot of seeds in a position to germinate until, finally, all weed seeds near enough to the surface to grow will have been destroyed.



A 6½-foot cut alfalfa cultivator.

PRECEDING CROP.

What the preceding crop is does not seem to be important so long as it will permit of thorough soil preparation for the alfalfa. A corn crop which can be given clean culture will usually be best, though for summer seeding any spring sown crop which can be removed early in the summer may be used. Early potatoes, peas for canning, clover and small grain crops can all be used to precede summer sowing.

PREPARING THE SEED BED.

Preparation of the soil for alfalfa should usually be begun with the preceding crop, applying any needed lime at that time. In any case, a fine, mellow seed bed with a firm sub-surface should be prepared and weed seeds killed by repeated harrowing, as directed in preceding paragraphs. Extra deep plowing is not advisable. The plowing should be done as long as possible before seeding so that the soil may become thoroughly settled and firm. Disking before spring or summer plowing will help to make a good seed bed. Where alfalfa is to follow peas or early potatoes, a good seed bed can usually be prepared without plowing.

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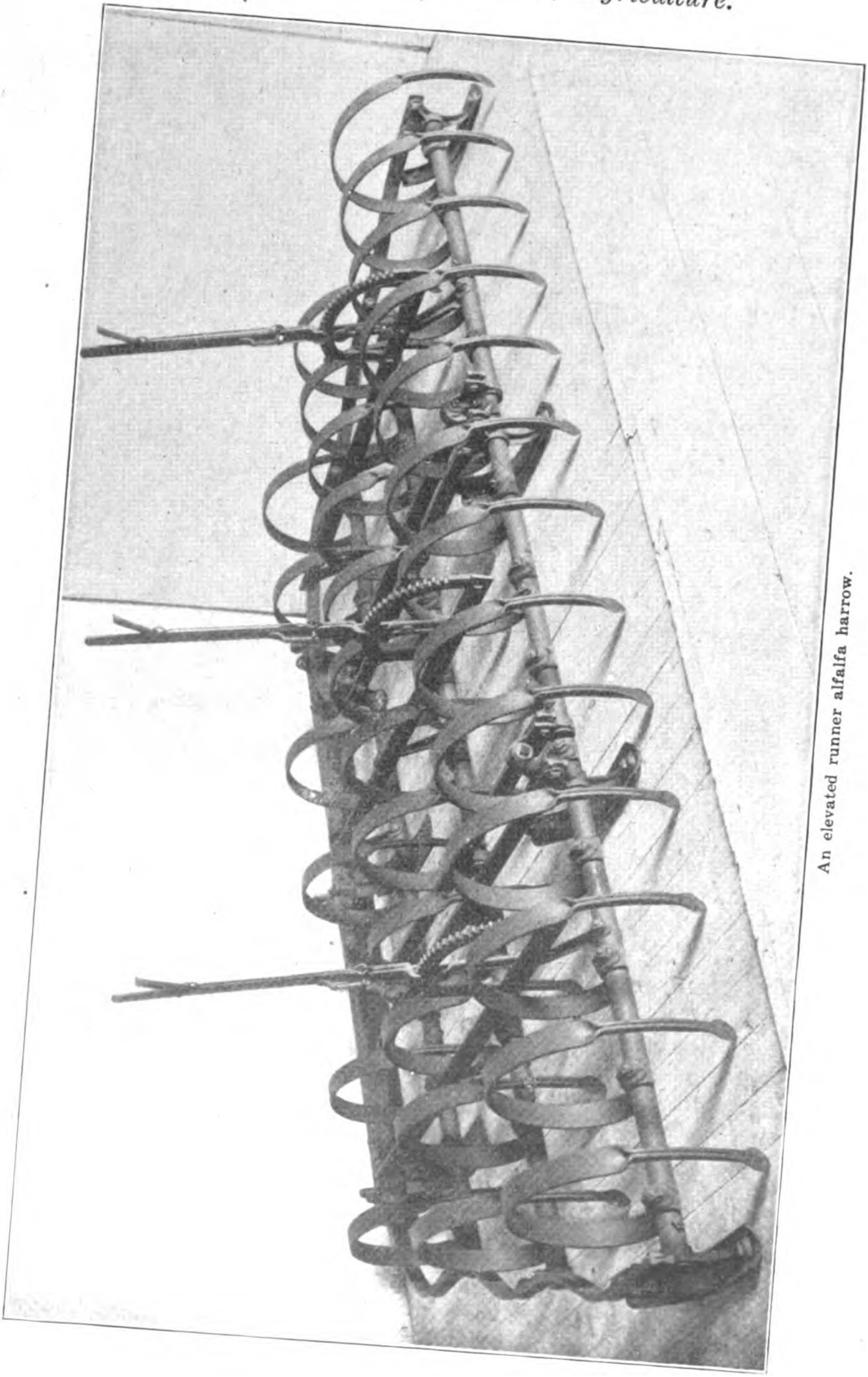

An elevated runner alfalfa harrow.

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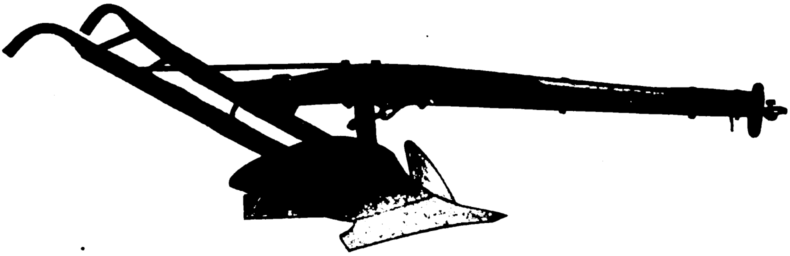
THE NURSE CROP.

Whether or not alfalfa should be sown with a nurse crop has been a much discussed question. The experiments of this station and the experience of many farmers in the state have shown that a nurse crop is not necessary. Of 269 successful alfalfa growers answering the question "Is a nurse crop necessary?" 196 or 72.8 per cent replied "No," while 73 or 27.2 per cent favored the nurse crop. Where the nurse crop was favored, spring seeding was most commonly practiced.

Generally speaking, there is no good reason for spring seeding alfalfa since it will seldom make a satisfactory hay crop the first season, and all that is needed is a sufficient growth to establish the plants thoroughly and enable them to pass successfully through the winter, and summer seeding will seldom fail to do this. The danger of trouble with weeds is altogether against spring seeding.



A breaker for plowing up alfalfa.

When spring seeding is favored, a nurse crop will help to keep down weeds. A half seeding of oats or barley should be used and this should be cut for hay soon after heading so as to give the alfalfa full possession of the ground before hot weather begins. Summer seedings do not require a nurse crop.

METHOD AND RATE OF SEEDING.

Probably the best method of sowing alfalfa seed is with a drill, as by this means it may be covered most uniformly. When a nurse crop is sown with it, as in the case of spring seeding, the alfalfa seed should be put into the grass seed attachment and dropped ahead of the drill shoes. In the case of summer seeding, without a nurse crop, drilling the same as wheat, with the drill set to run as shallow as possible, will usually be best. When drilling is not convenient the seed may be sown broadcast and lightly covered with a harrow.

The rate of seeding should be about 20 pounds per acre although with favorable conditions 15 pounds of good seed will be sufficient.

CLIPPING YOUNG ALFALFA.

The information we have concerning the clipping of alfalfa during the first season is too contradictory to permit of formulating any general rule. It seems, however, that clipping has sometimes been overdone and that young alfalfa should rather be allowed to grow undisturbed so long as it is doing well and does not bloom. In the case of early seeding, one clipping late in the summer will usually be sufficient. Generally

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1	2	3	4
Sown July 30, 1907.	Sown Aug. 10, 1907.	Sown Aug. 24, 1907.	Sown Sept. 12, 1907.
Yield of hay, 285 lbs.	Yield of hay, 315 lbs.	Yield of hay, 135 lbs.	Yield of hay, 11 lbs.

Yields of alfalfa cut June 2, from equal sized plats sown at different times during the summer, as shown above. Each plat is represented by two cocks of hay.

speaking, clipping should be practiced only when the growth seems checked, or the tops of the plants turn yellow. If not too heavy, the cut material should be left on the ground to act as a mulch. In the case of late summer seeding, all growth should generally be allowed to die down naturally for protection over winter.

THE TIME TO CUT ALFALFA FOR HAY.

When alfalfa is used for hay it should be cut whenever the new shoots at the crowns of the plants are well started. This is a better guide to the proper time for cutting than is the appearance of blossoms. The base of the plant should be carefully examined. The new growth appears in the form of buds at the base of the old stalks. The new shoots should have a start of half an inch to an inch before the old growth is cut. In the investigation carried on during the past year several farmers stated that they had killed their alfalfa by cutting too soon. On the other hand, it has been observed that nothing is gained by letting it stand after growth has been checked, no matter what the cause may be. Whenever the tops turn yellow, or the crop becomes seriously affected by leaf spot or other disease it should also be cut, even though the fresh shoots have not started.

MAKING ALFALFA HAY.

About the best practice in making alfalfa hay is to mow in the afternoon. The next morning, as soon as the dew is off, the field should be gone over with a tedder. In the afternoon it may be raked and put up in small cocks where it should be allowed to cure for a few days before hauling to the barn.

Care must be exercised to avoid loss of the leaves. The leaves are fine and easily lost and should never be allowed to become dry and brittle before raking up.

A side-delivery rake is a good implement for taking up the hay and where such is used a tedder is not necessary.

Where much alfalfa hay is made, it will pay well to use canvas shock covers to protect the cocks from rain.

PASTURING.

Alfalfa should never be pastured the first season, and in most cases it will be best to use it for hay-making during the second season also, in order that it may become thoroughly established before animals are allowed to trample over it. It should never be pastured closely, as this injures the crowns of the plants. Horses and sheep are more likely to do damage in this way than are cattle or hogs. Alfalfa pasture is especially good for hogs during hot weather. With cattle and sheep, care must be exercised to avoid bloating. At first the animals should be turned in for only a short time each day, and when the alfalfa is wet with dew or rain there is still greater need of care to avoid bloating. It is wise to be a little more careful than with clover.

Grades of alfalfa hay, established by the National Hay Association, at Kansas City, July 17, 1912:

Choice Alfalfa.—Shall be pure alfalfa of a bright green color, fine stemmed, leafy, sound and well baled.

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No. 1 Alfalfa.—Shall be reasonably coarse alfalfa of a bright green color, or reasonably fine leafy alfalfa of a good color, and may contain two per cent of foreign grasses, a trace of air-bleached hay on outside of bale allowed, but must be sound and well baled.

Standard Alfalfa.—Shall include all alfalfa not good enough for No. 1, including pure, sound, brown alfalfa. Also bright alfalfa containing not more than five per cent foreign grasses, sound and well baled.

No Grade Alfalfa.—Shall include all alfalfa not good enough for other grades.

AN ENGLISH BLUE-GRASS CENTER.

By J. C. Mohler, Assistant Secretary State Board of Agriculture.

If John James Ingalls were alive and visited the territory comprised in the adjoining corners of the four counties of Johnson, Miami, Franklin and Douglas, Kansas, in all likelihood he would be moved to another epic on blue grass, as the district described is perhaps as notable as any in the world for English blue grass. Of course, Ingalls's masterpiece was inspired by the seductive Kentucky blue grass, quite different from English blue grass, but beautiful enough in its early spring and late fall verdure to stir the poetic soul of an Ingalls and profitable enough to its growers that they joyfully sing its praises.

While it is popularly spoken of as English blue grass, to be exact that is not its proper name at all, as it is meadow fescue, and, to be more technical still, *Festuca pratensis*, and by this designation we avoid quarrels with our friends the botanists. Under any other name, however, its value would be as great. Unlike Kentucky blue grass, which is essentially a pasture plant of great excellence, English blue grass here is esteemed first for its seed, then for the pasturage it affords, and next for hay.

Of this blue-grass territory, Wellsville, in Franklin county, may be said to be the center, and in the year 1910 one dealer there, A. D. Hostetter, purchasing for one of the most extensive seed houses of the West, paid the growers more than $27,000 for their seed. The quantity he handled was about 150,000 pounds, for which he paid 18 2/11 cents per pound, or $4 per bushel of 22 pounds, this being the standard weight per bushel of clean seed. About 20,000 pounds were bought also by two other dealers, bringing the total value of the seed marketed in Wellsville that year to more than $31,000. In 1911 the same agent paid out on behalf of his clients probably between $50,000 and $60,000, the price having been forced to $5 per bushel by the farmers forming a pool of a considerable portion of the year's output. This is quite a considerable business for a village of about 600 inhabitants, a goodly sum to distribute in any neighborhood for a commodity with which comparatively few are familiar. Kansas is such a big state, with such a diversity of industries, that the people of one end scarcely know what those of the other end are doing. It is not generally known that of the English blue-grass seed crop of the United States Kansas annually produces 95 per cent, if not more, and, aside from that needed for home seeding, it is practically all exported to Germany, where it is grown for permanent pastures and meadows, and not for seed. Hence Kansas is unique in meadow fescue, as well as in various other productions. The growers never want for a market, as buyers are on hand at the proper time to bid for the seed crop, whether the price is high or low. In 1910 bidders from six different points were on the ground at Wellsville at the same time.

About Wellsville ten or twelve bushels per acre is an ordinary yield, and at $4 to $5 per bushel, as in 1910 and 1911, it can be readily seen that the crop runs into big money, and its cost of production is approximately the same as for wheat. Yields have been as large as twenty-five and twenty-eight bushels, and at other times as low as five bushels per acre. Also, it must not be assumed that $4 and $5 per bushel is an average price, for it is not; instead, it is the highest price paid in many years, if not the highest ever. Probably $1.50 would be more nearly an average, taking all the years. The writer is advised that the bulk of the crop of 1912 was marketed at a price averaging considerably below $1.50.

English blue grass, or meadow fescue.

But a point is here: English blue grass for seed endures under the usual methods from three to five years; after that it does not yield seed profitably. At all times it is a profitable grass for pasture, and as it is no unusual thing for the prices of seed to soar, the chances are that every now and then a big stake will be made. One can't lose, and stands to make a big win. In ordinary years, when yields and prices are what may be termed normal, say about 220 pounds per acre, at 7 cents per pound, there is profit. The cost of preparing the ground and seeding is distributed over three, four or five years, and hence the expense charged against the seed is harvesting, threshing and marketing, plus the annual apportionment of its seeding. This is figuring purely from the view point of the seed crop, while its grazing value is always important; in fact, as much so while it lasts as any grass devoted exclusively to grazing, and it is superior to some. It has been the experience of the farmers that the value of the pasture per season equals all the expenses of harvesting, threshing and marketing.

On this basis the income from the seed would be net, and figuring thus, Wm. H. Moherman, a pioneer Kansas farmer, now retired and vice president of a bank at Wellsville, reported that he had realized in a single season from his forty acres of English blue-grass seed $60 per acre. Another Wellsville farmer, R. F. Lidikay, who rented out his blue grass on the shares one season, went on a visit to the Pacific coast country, and when he came home was handed $500 as his half of the proceeds from the seed raised on eleven acres. These, however, are extraordinary examples, but when prices are high $30 to $40 per acre is not unusual.

Fluctuations in prices depend largely upon the supply of seed and the demand for it. The requirements are pretty uniform and the demand is limited. If a large crop is raised the seed is low-priced, and if a small crop is raised the price is high. In 1910 there was but a small crop, owing to the covering of ice which killed so much of the state's wheat in the winter of 1909-'10, and prices were high accordingly. The seed grown was on fields mostly two, three and four years old, but the best crop is always expected the first year after sowing in the preceding fall. So the comparatively few new sowings that came through the winter in good condition were almost gold mines for their owners.

While this territory about Wellsville seems to have a soil peculiarly adapted to seed production, meadow fescue is raised in many portions of Kansas—Greenwood, Coffey and Lyon counties especially raising considerable.

Any land that will produce good corn will raise this blue grass, and a stand is no more difficult to secure than one of timothy and clover. Clover is sometimes sown with the blue grass, and of course this addition helps the soil and increases the value of the pasturage, but if intended for seed the clover makes the curing of the blue grass more difficult, and the "sweat" of the clover may darken or stain the blue-grass seed, which is undesirable.

English blue grass rests the soil and improves its physical condition. Corn is invariably the crop to follow it, and increased yields are invariably the result. Mr. Moherman, previously mentioned, reports an

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average yield of 75 bushels of corn per acre, his record crop, on blue-grass sod. Alsike clover, however, was mixed with his blue grass, and he thinks well of such seeding. He drilled in twelve pounds of blue-grass seed, and with a wheelbarrow seeder sowed four quarts of alsike to the acre. The clover is supported somewhat by the blue grass, which is of upright growth, and the two mature their seed at about the same time, are threshed together, and by the use of sieves of different meshes are separated and cleaned. A mixture of timothy, clover and English blue grass sown for pasture gives an unusually long period of excellent grazing.

The first seed crop is always the best, and the grass is never pastured in its first season until after harvesting the seed. Then the aftermath should attain a good growth before turning on the stock, as pasturing too early after cutting will cause the crop to run out. Grazing begins in the early fall and may be continued profitably and successfully until the first or middle of May, weather permitting, and enough stock may be grazed to eat the grass so closely that the ground will appear bare. It will support as many head of stock per acre as clover and timothy; all animals relish it and may safely graze upon it without restriction. It is a strong grower, and the first grass to respond to the growing weather of spring. Leaving the seed crop and its possibilities out of the question, meadow fescue, being a perennial, should be found of good value for permanent pastures wherever conditions favor its growing. The ease with which a stand is secured, and its value as a soil renovator, cause it to fit happily into various rotations.

The husbandmen of this English blue-grass territory are wealthy; not that they owe their riches to blue grass alone, but to a judicious, intelligent agriculture wherein blue grass played its part. Some idea is gained of the importance of their farm productions by the statement that there are more agricultural products shipped from Wellsville than from any other point on the great Santa Fe railway system, in proportion to population. Many farmers there could write checks amounting into the thousands and feel no embarrassment, and the checks would be honored, too.

Where such a record has been made it naturally follows that the citizens are public-spirited and progressive. Such industry is not compatible with stagnation. Wellsville and the community is typical of Kansas—prosperous, quiet and orderly, its people living unostentatiously in a wholesome environment of peace, plenty and happiness. It is one of the old settlements of Kansas, where yet linger many of the pioneers who courageously fought the battles of the early days and are now enjoying the blessings of a civilization they were largely instrumental in bringing about. In many ways it reminds one of the unobtrusive, thrifty New England village, noted for the character of its citizens and their substantial rating in this world's goods, accumulated through means by which no one was plundered; dwelling together in a brotherly fashion, with a supreme satisfaction in their surroundings, with no millionares or paupers, and where there is an even distribution of wealth.

In this famous blue-grass region the farmers are alert, well posted and up and doing. They have for years maintained an organization known

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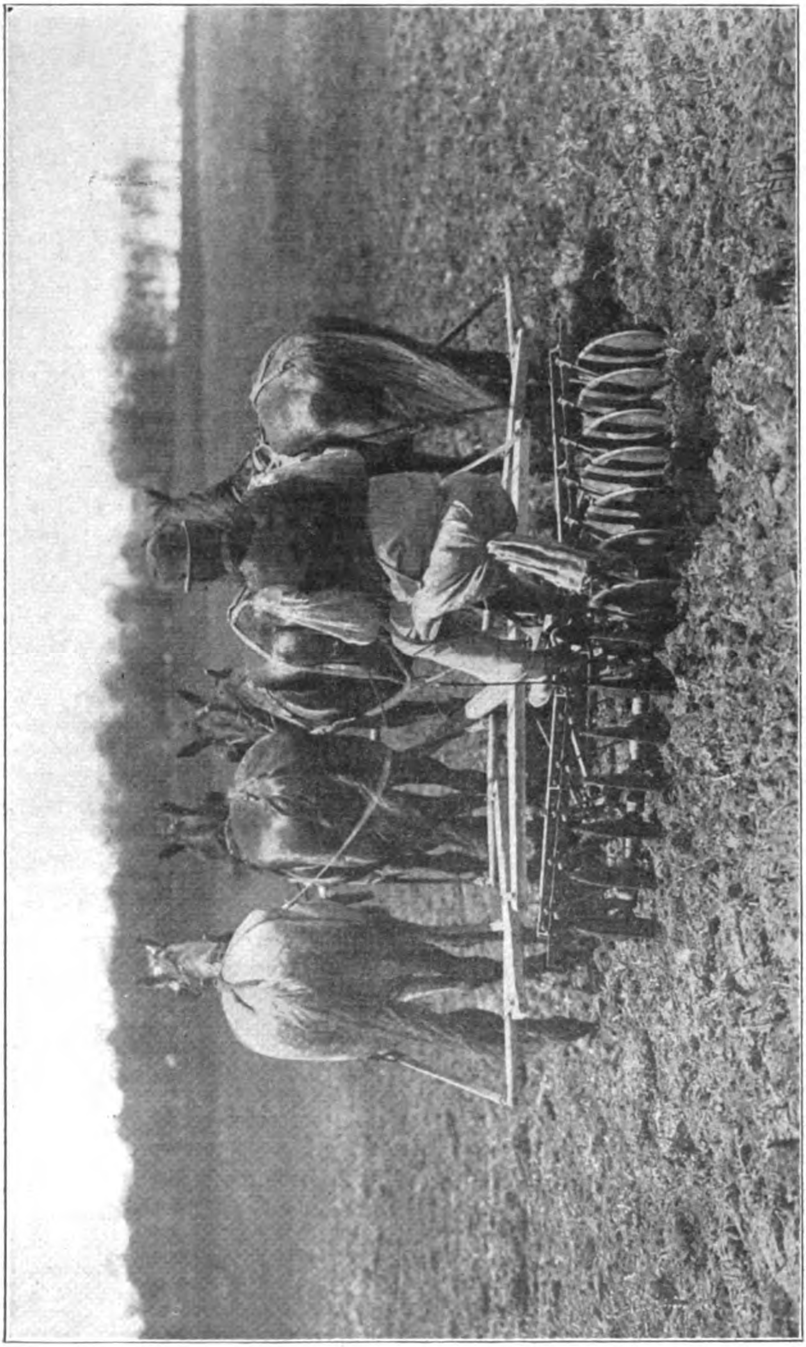


Making good use of the disk harrow.

as the Tri-institute, that meets yearly in turn at Gardner, Edgerton and Wellsville, near-by towns. Its meetings are held in two-day sessions, and it is one of the earliest and most successful organizations of its kind in the state. In practice it works out as a sort of community picnic, a love feast, and above all an educator. The many old-timers have a rich fund of practical experience to draw upon, balanced by the views and methods of the younger generations having the benefit of training at the Agricultural College, and who are taking the places of their sires on the old homesteads. The influence of this institute has been potent in the prosperity and enlightenment of this community.

It is a community that deserves to be extolled, not alone for its achievement with blue grass, but because it is awake to its opportunities and is continually going forward. Its blue grass has attracted special attention to it, but as a matter of fact meadow fescue cuts only a small figure in the aggregate of crops for the four counties of Johnson, Franklin, Miami and Douglas, which, in 1910, with the value of animal products added, marketed farm products valued at nearly $13,000,000.

Neither is this article intended to influence any widespread sowing of meadow fescue as a means of becoming rich quick, but there is hardly a community in Kansas but has its own peculiar advantages, and they should be sought out and turned to profit.

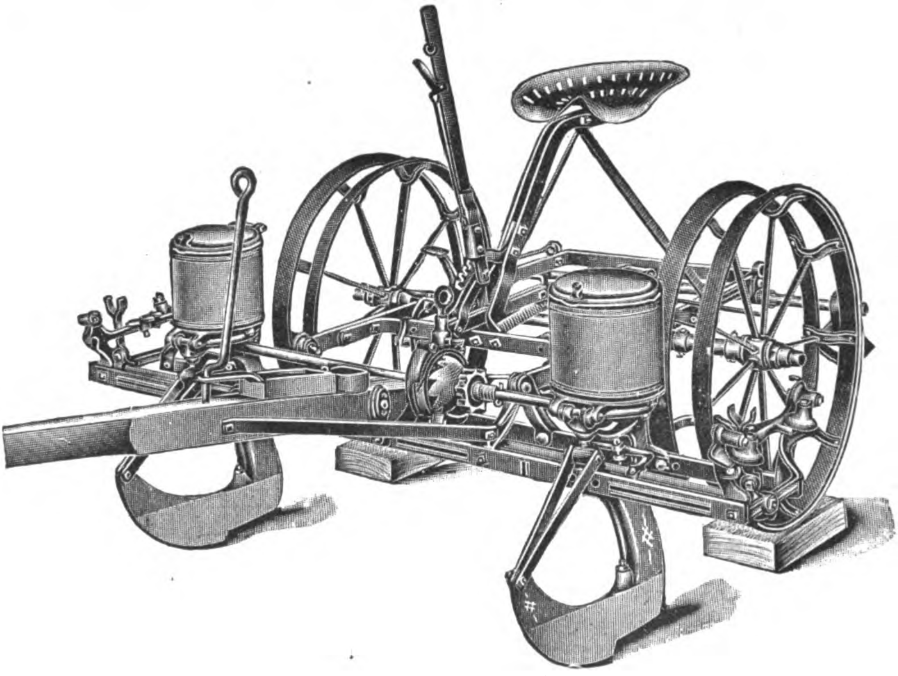
About Wellsville, for instance, the soil is apparently especially adapted to the production of English blue-grass seed, and the farmers there have made the most of that circumstance. Let others elsewhere utilize their local advantages to the utmost, if not already doing so; let them experiment and learn if their soils and climate are not peculiarly suited to the cultivation of some useful plant, for conditions may be exceptionally favorable for the economical production of a high-grade commodity that will bring increased prosperity to its growers and be as important in its neighborhood as the English blue-grass seed crop is to the Wellsville neighborhood.

THE HANDLING OF CORN ON THE FARM AND ITS INFLUENCE ON COMMERCIAL GRADES.

By Dr. J. W. T. Duvel, United States Department of Agriculture, Washington.

According to the best statistics available, the corn crop of the United states for the year 1911 was 2,531,488,000 bushels. While the crop was the smallest since 1904, the estimated farm value on December 1 was $1,565,258,000—the greatest in our history.. Yet with this enormous value, it is certain that a very considerable quantity of our corn crop is produced at a loss. The average yield per acre for 1911 was 23.92 bushels. If planted in hills 3½ feet apart each way, this yield is equivalent to one ear per hill, each ear weighing slightly more than six ounces and having a length of about five inches. In other words, a small five-inch nubbin to each hill represents the average for the United States. Many farmers, even on large acreage, are producing an average of forty, fifty, sixty, seventy and eighty bushels per acre, and greater yields are becoming common. It is therefore very evident that the majority of corn growers are producing less corn per acre than the average for the United States. In most of these cases the value of the corn when ready for market is less than the cost of production.

In addition to the low yields on many farms, investigations have shown that there is an enormous loss in the value of the corn crop as a result of deterioration that takes place in the corn after it is produced by the farmer. It is practically impossible to determine with any degree of accuracy the extent of this loss, but two cents per bushel would be an extremely conservative estimate. At this low estimate, the loss, on the basis of the 1911 crop, would be more than $50,000,000. In my opinion, the loss could more safely be placed at twice this amount. Millions of bushels of corn undergo partial deterioration on the farm before being fed or marketed. Likewise, a high percentage of the 550 or 560 million bushels of corn of commerce is subjected to an even more marked deterioration. Much of this corn becomes musty, sour, hot, discolored and even rotten before it reaches the final consumer.



A convertible planter, for any kind of corn.

As a rule, the cause of this enormous loss, resulting from the deterioration of the crop after it is grown, can be attributed to (*a*) the present methods of harvesting, handling and storing corn on the farm, and (*b*) the growing of large, late-maturing varieties which do not ripen sufficiently early to permit the proper curing of the corn before cribbing or marketing, or before it is damaged by freezing. These two groups of causes may, in turn, be summed up in a single expression—*excessive moisture*.

THE PRODUCTION OF LARGE LATE VARIETIES.

In the production of a higher commercial grade of corn, which will not show such marked deterioration after it is harvested or marketed, there is no factor of greater importance than maturity. It has been fully demonstrated that the production of large, late-maturing varieties of corn, which do not ripen and cure properly, is undesirable from a commercial point of view. Late varieties almost invariably contain high percentages of moisture. High-moisture corn does not contain a feeding or manufacturing value equivalent to the same weight of low-moisture corn. High-moisture corn is certain to undergo marked deterioration during storage in elevators or warehouses, and even in farmers' cribs. But with a better understanding of grades and intrinsic values, together with the almost universal use of the moisture tester, the time is at hand when corn must be grown for quality as well as for quantity. Buyers, feeders and manufacturers of corn products are demanding more good corn, with a higher percentage of dry matter, not more water. In the growing, selection or breeding of corn for increased production, comparisons must be made on the yield of shelled corn calculated to a water-free basis or to a uniform moisture content; and not on the total yield in pounds of both corn and cob at the time of harvesting, regardless of the percentage of moisture contained therein.

The importance of knowing the moisture content, if yields are to be determined accurately, is more clearly brought out in the following table, in which is shown the yield per acre in bushels of 56 pounds of shelled corn containing certain specified percentages of moisture between 12 and 28 per cent.

TABLE *showing the variation in yields per acre of shelled corn containing different percentages of moisture.*

Dry corn, 12 %	Present commercial grades.			Sample grades.	
	No. 2, 16 %	No. 3, 19 %	No. 4, 22 %	25 %	28 %
Bush.	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*
50	52.4	54.3	56.4	58.7	61.1
60	62.9	65.2	68.0	70.4	73.3
70	73.3	76.1	79.0	82.1	85.5
80	83.8	86.9	90.3	93.9	97.7
90	94.3	97.8	101.5	105.6	110.0
100	104.8	108.7	112.8	117.3	122.0

The moisture content of old corn during the summer months will, as a rule, average about 12 per cent, provided that it has been properly harvested and cribbed. For this reason corn containing 12 per cent of moisture has been taken as the standard for comparison, with yields of 50, 60, 70, 80, 90 and 100 bushels per acre as indicated in column one of the table. The moisture percentages of 16, 19 and 22 represent the maximum percentages of moisture allowed in the commercial grades of No. 2, No. 3 and No. 4 corn, respectively, in accordance with the rules for grades established by the Grain Dealers' National Association. The two highest percentages, 25 and 28, show about the quantity of water which is generally contained in the kernels of large, late-maturing va-

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rieties of corn at the time of harvesting and cribbing. A considerable quantity of corn will even show these high percentages of moisture at the time of marketing, and higher percentages are not uncommon.

Many of our good farmers who exercise proper care in the selection, storing and testing of seed corn, and who practice a system of crop rotation and handle their soil in such a way as to conserve its fertility and the necessary supply of moisture, are now producing 80 or more bushels of shelled corn per acre, calculated to a 12 per cent basis of moisture. It will therefore not be out of place to make a few comparisons in the foregoing table with the eighty-bushel-per-acre yield. On the basis of 16 per cent of moisture, the maximum moisture content allowed in the commercial grade of No. 2 corn in accordance with the rules adopted by the Grain Dealers' National Association, the yield per acre would be 83.8 bushels, as shown in column 2 of the table. On the basis of 19 per cent of moisture, the maximum moisture content allowed in No. 3 corn, the yield would be 86.9 bushels, as indicated in the third column. On the basis of 22 per cent of moisture, the maximum percentage allowed in No. 4 corn, the yield would be 90.3 bushels, or an increase of 10.3 bushels (nearly 13 per cent) over the corn containing 12 per cent of moisture. On the basis of 25 per cent of moisture, the yield would be 93.9 bushels, and 97.7 bushels if the moisture content of the corn at the time of weighing was 28 per cent, as shown in the last column of the table.

In the foregoing example we have yields per acre, or so-called yields, ranging from 80 to 97.7 bushels of 56 pounds each. The dry matter, however, is the same in each case. Granting that the dry corn with 12 per cent of moisture has a value of 65 cents per bushel, which is about the present market price of good corn, the intrinsic value of the low-grade No. 2 corn with a maximum of 16 per cent of moisture would be 62 cents per bushel. The intrinsic value of the No. 3 corn with 19 per cent of moisture would be 59⅞ cents; the No. 4 corn containing 22 per cent of moisture, 57⅝ cents; the corn containing 25 per cent of moisture, 55⅜ cents; and the corn containing 28 per cent of moisture, 53¼ cents. These values are only approximately correct, being calculated to the nearest eighth of one cent. At the price of 65 cents per bushel for the dry corn containing 12 per cent of moisture, the value decreases nearly ¾ of one cent per bushel for each one per cent increase in moisture content. Likewise, the difference in value is based solely on the difference in dry matter and does not take into consideration the law of supply and demand, the increased danger of deterioration or extra expense of handling high-moisture corn.

PRESENT METHODS OF HARVESTING AND CRIBBING.

In addition to the growing of large, late-maturing varieties of corn, which in many cases are considered as heavy yielders simply because they contain high percentages of moisture, there are other factors which influence the commercial grade of the corn as marketed. If more attention were given to the shucking, cribbing or storing and general handling of corn on the farm the quality would be greatly improved, and the heavy losses resulting from deterioration of the crop after grown would likewise be greatly diminished.

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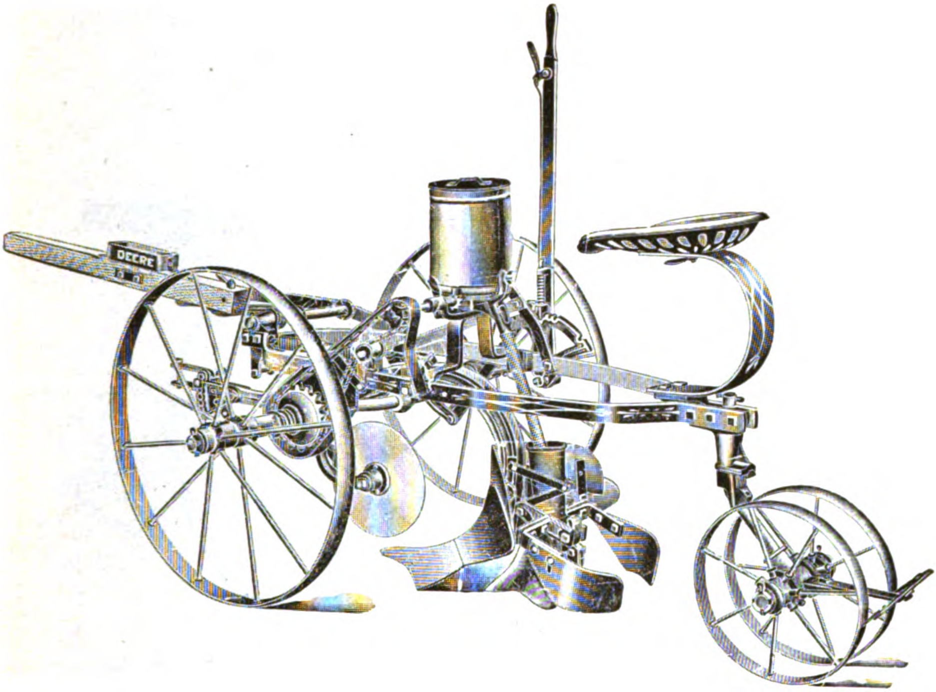
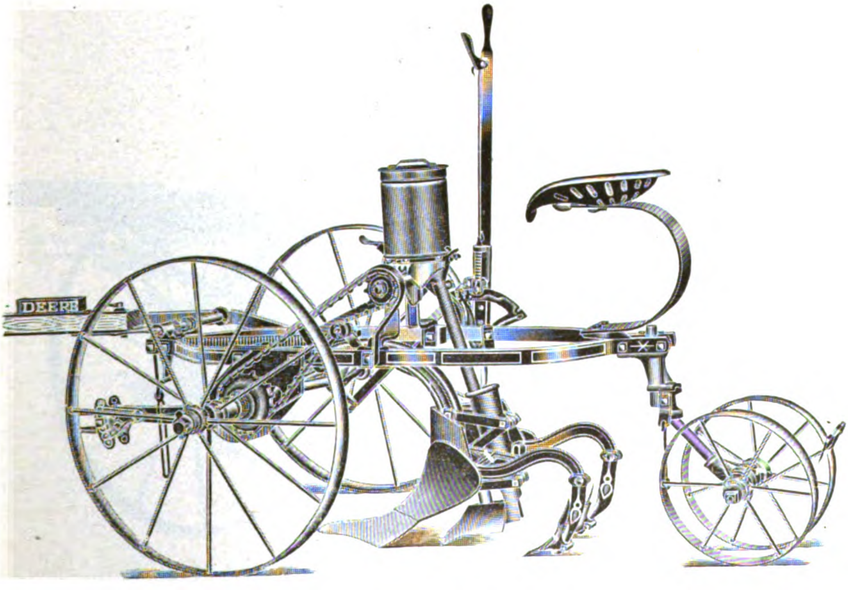


A single-row lister.



A single-row lister and drill.

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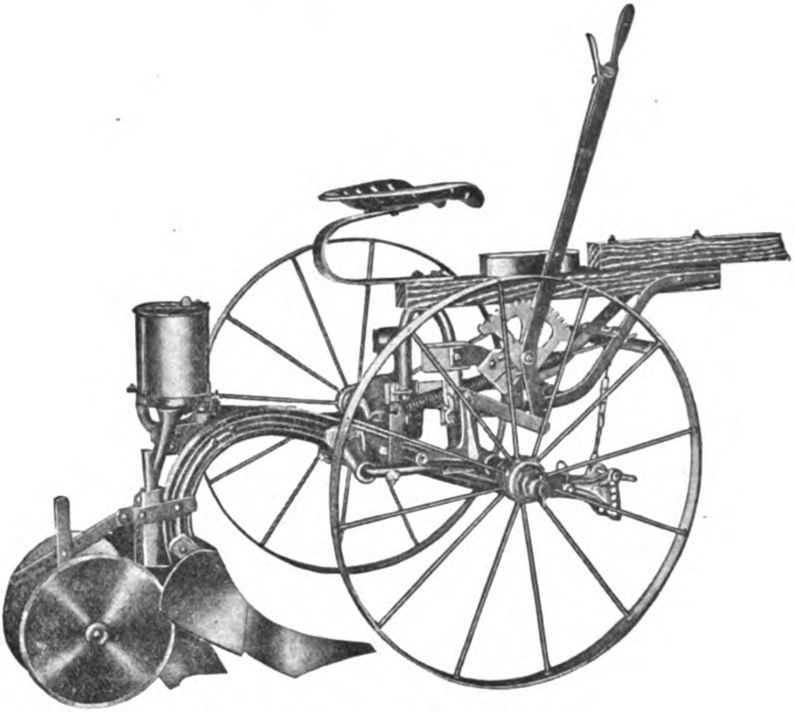
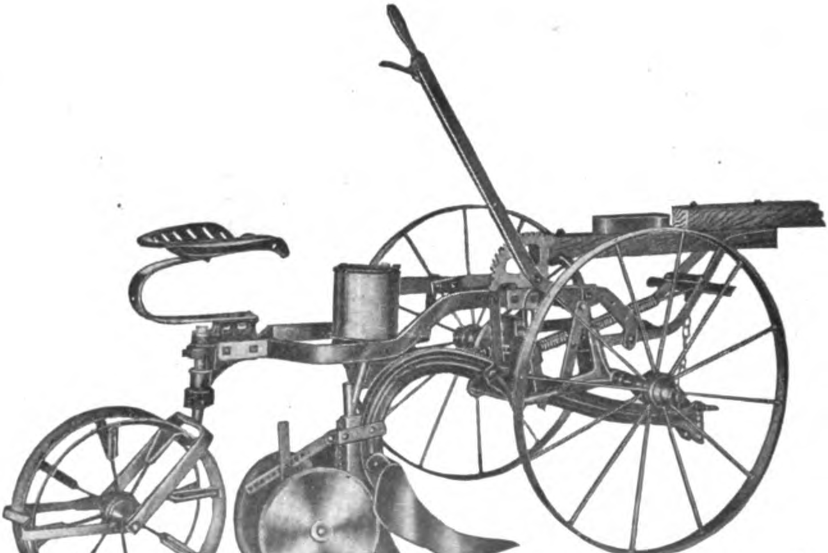


A good two-wheel lister.



A successful three-wheel lister.

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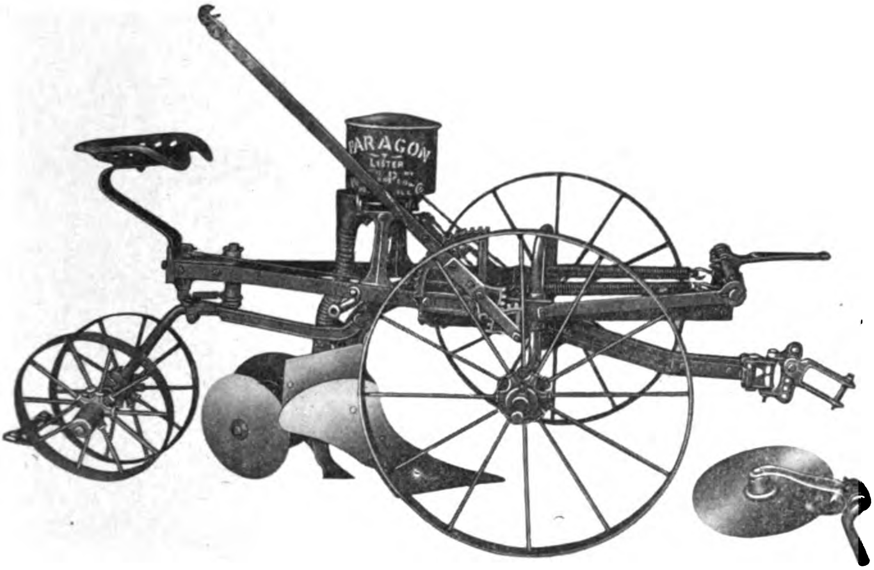
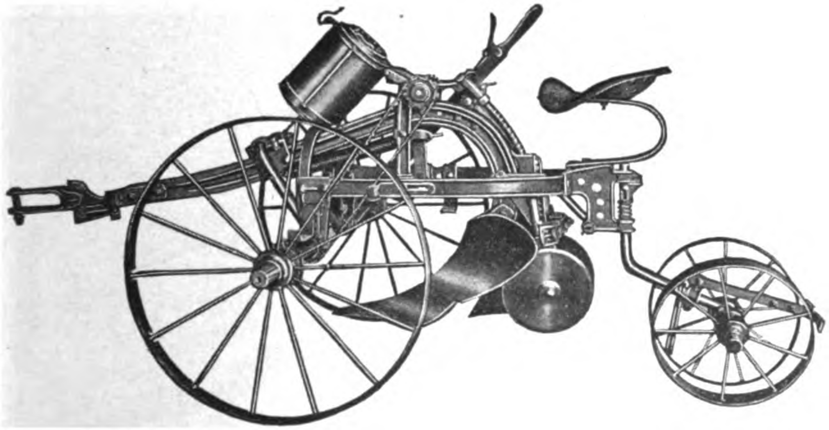


The latest in four-wheel listers.



Another four-wheel lister.

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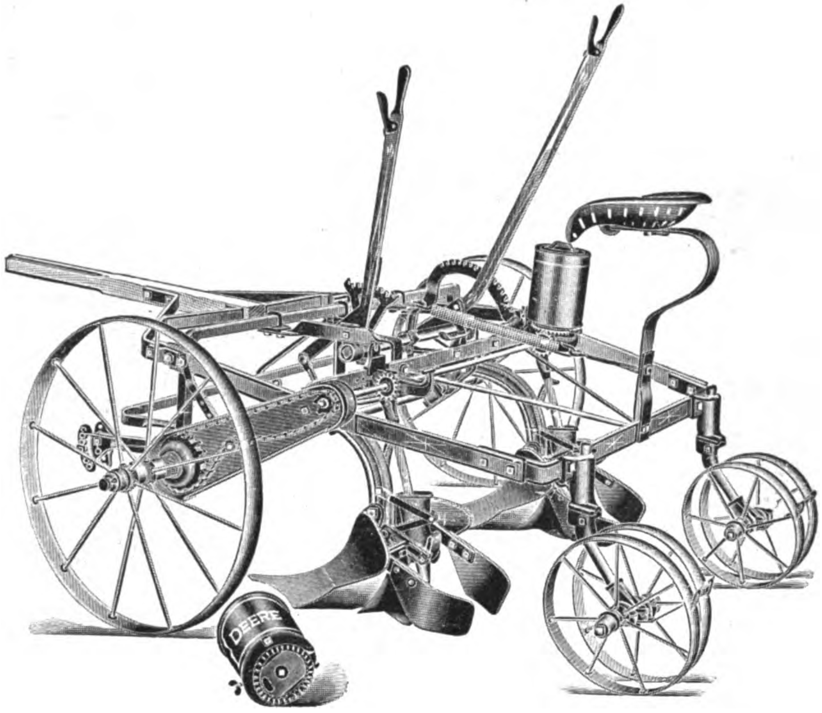
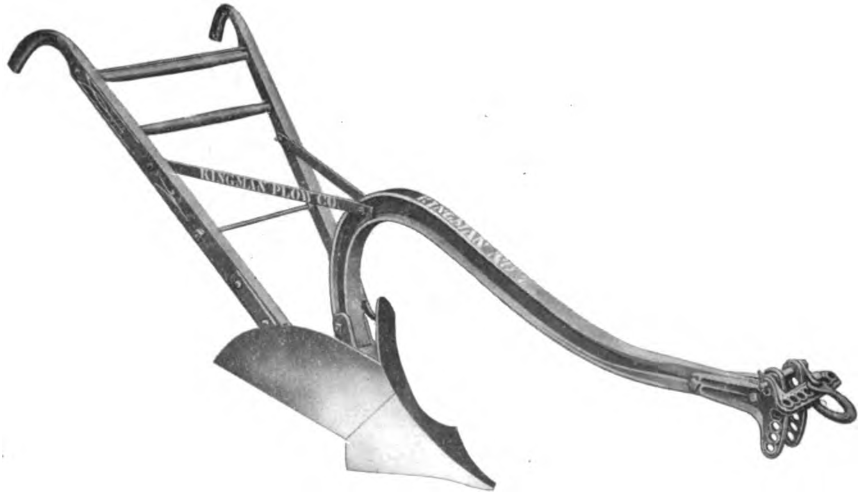
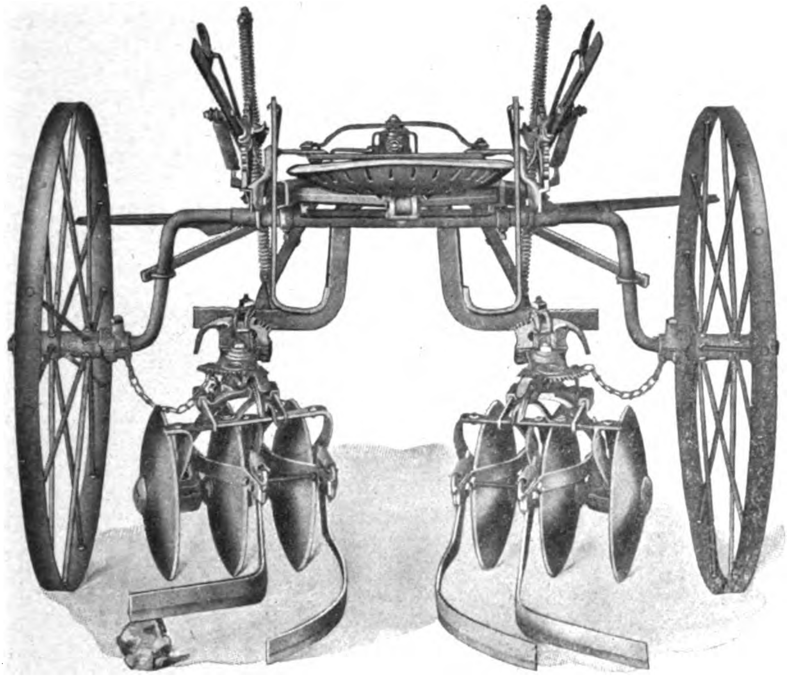


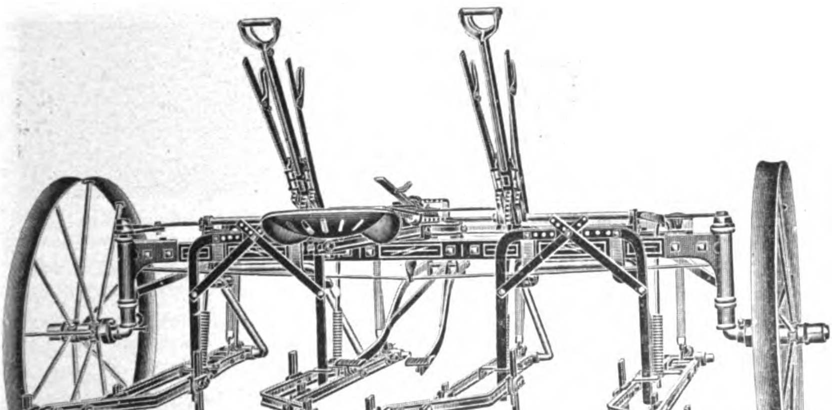
A two-row lister.



A middle buster, for use in listed ground.



A disk cultivator for corn.



A two-row cultivator; does the work of two single-row cultivators.

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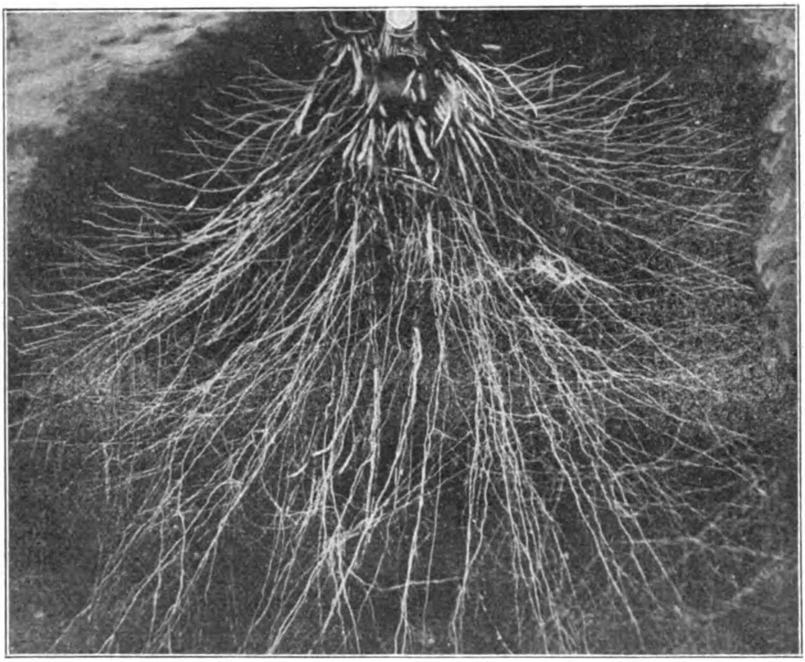
Farmers who store their corn in poorly constructed cribs or pens, or leave it piled on the ground for weeks and even months, exposed to rain and snow, as is the common practice in many sections, have no just cause for complaint on receiving a grade of No. 4, "sample" or "rejected."

Likewise, much of our corn is harvested before it is in proper condition for cribbing. Shucking is frequently only half done, and the corn goes into the cribs mixed with husks and masses of silks, together with considerable quantities of shelled corn. Such corn, when stored in large piles or cribs, is certain to become damaged, unless the corn is unusually dry, which is not likely to be the case.



Root system in hill of corn. Notice the immense number of small, fine feeders near the surface. An argument for shallow cultivation.

Unfortunately, corn growers have had but little encouragement to grow and market a better quality of corn. Commercial practices of buying and grading have placed the premium on poor farm methods and not on good. Prices at country elevators have been on the basis of "corn," regardless of quality. The country shipper has been forced to sell on the basis of "No. 3 or better," which rule is still in force in many markets, making it practically impossible for the managers of country elevators to pay the deserved premium for good corn.

It is gratifying, however, to know that conditions are rapidly changing. At no time in the history of the grain trade of the United States has there been such a movement towards a better quality of commercial corn. Feeders and manufacturers of corn products are fast beginning to realize

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that they have been paying excessive prices for low grades of corn. With the present high prices, the consumer has learned that he can not buy corn simply as corn. He has learned to ask: How much dry matter does it contain? How many pounds of beef or pork will it produce? How many pounds of starch, glucose or other products will it yield?

Under such conditions the careful farmer who grows and markets good grain will receive payment in accordance with its true value. The careless farmer who grows and markets damp grain of poor quality will be obliged to accept heavy discounts or improve his farm methods and the quality of his corn.

Corn piled in this way is almost certain to undergo marked deterioration.

Approximately 30,000,000 bushels of the 1910 corn crop had to be artificially dried after being marketed. Owing to the high percentage of moisture which it contained, a large amount of this corn became musty, sour, and even "hot and rotten" before it could be dried. But granting that the corn was sound at the time of drying, the loss in weight resulting from the artificial drying would exceed an average of more than 5 per cent, equivalent to 1,500,000 bushels. Add to this big shrinkage the cost of drying, the cost of marketing the surplus water, the extra freight charges on excess water, etc., the resulting loss would be equivalent to approximately 5 cents per bushel. In actual practice it works out about as follows: The farmer who grows and markets high-moisture, low-grade corn gets about 2½ cents more per bushel than his corn is worth, while the farmer who grows and markets dry corn of good quality gets about 2½ cents less than his corn is worth.

Likewise, the railroads pay annually large sums for the loss of grain in transit. Much of this shortage is due to natural shrinkage, which depends largely on the moisture content of the corn at the time of shipment. Money to pay these claims must come from freight receipts, ultimately charged back to the producer of grain of high quality.

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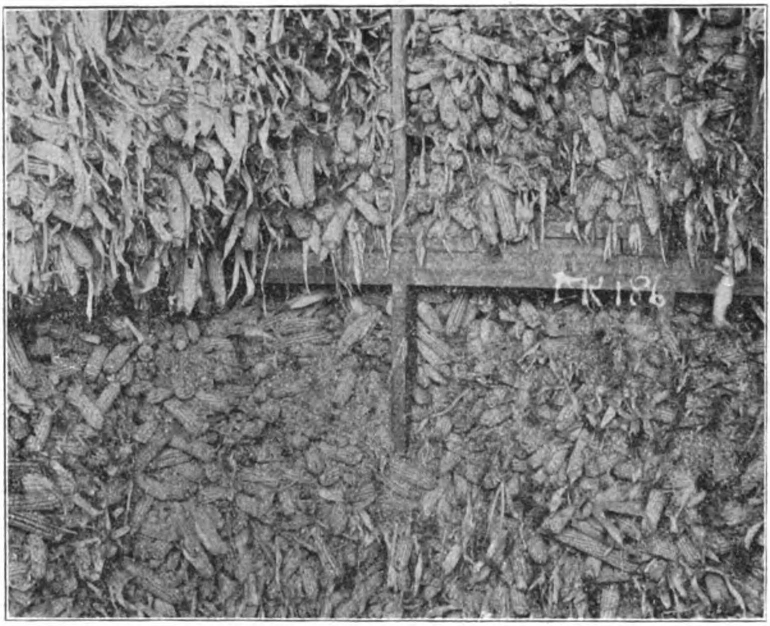
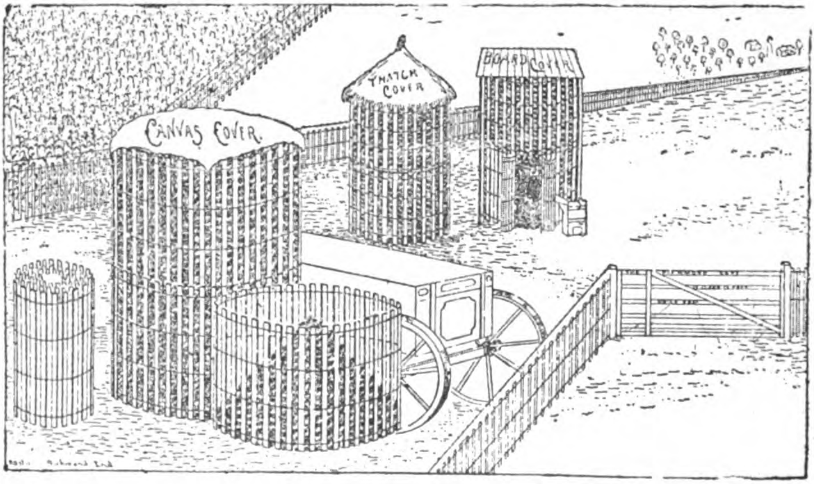


The corn in this crib became moldy and musty on account of shucks, masses of silks and an excess of shelled corn.



Handy portable corn cribs and fence.

WATER REQUIREMENTS OF CORN.

Synopsis of Nebraska Experiment Station Bulletin 128, by E. G. Montgomery and T. A. Kiesselback.

Results indicate that the best growth of corn is secured when the soil contains about 60 per cent of the water it could hold if saturated. Soil that is too wet gives decreased yields. It was also found that the amount of water required from day to day by growing corn varies with weather conditions, and in very much the same way as evaporation from the surface of a tank; also the greater the leaf area the greater the water requirement.

In 1911, corn was grown in two greenhouses, in one of which the air was dry, just as the natural outside air. In the other the air was artificially kept humid. The plant required twice as much water to make a pound of dry weight in the dry greenhouse as it did in the humid greenhouse, indicating that in a dry climate like Nebraska the water requirement for growing crops is very high as compared with a humid climate. It was found that in the year 1911 it took 345 pounds of water to make one pound of dry weight in corn, while in 1910 it took only 250 pounds. This was due to the fact that the air was much drier in 1911. So even with equal rainfall, in certain years the water requirement is very much higher than in others.

Soils of three degrees of fertility were used, and these same soils were each fertilized with sheep manure in a second series. It was found that the more fertile a soil the less water required to produce a pound of dry weight, and that the adding of manure decreases the water requirement except in the most fertile soils. This would indicate that manuring soils low in fertility will give a greater yield for a given quantity of water, but if the soils are sufficiently fertile the addition of manure will probably have little or no effect.

GROWING COWPEAS IN MISSOURI.

By M. F. Miller, Missouri Agricultural College.

The cowpea is a plant that is not sufficiently appreciated. Its value as a soil renovator, as a green manure crop, as a catch crop, as a pasture and as a regular hay crop, gives it a place in Missouri agriculture which warrants its wide acceptance by our farmers. Its wide adaptation to the soils and to the climatic conditions common to Missouri make it a crop that can be readily grown in practically every part of the state, and there is little doubt that its use is destined to a great increase, due to the constantly increasing prices of farm lands without a corresponding increase in production.

There are, however, some important reasons why the cowpea has not taken as important a place in agriculture as it deserves. Among these, are the high cost of seed and the difficulty in curing the hay. The

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gradual introduction of cowpea hullers that will handle the peas from the vine without cracking them will undoubtedly overcome the first of these difficulties to a considerable extent, while proper methods of handling the hay will in a great measure overcome the difficulty encountered in curing. A third reason which has prevented the wide acceptance of the cowpea in Missouri agriculture has been the fact that corn was considered a better money crop. As a matter of fact, for the man who is feeding live stock, this is not necessarily true. The statistics from the office of the Secretary of Agriculture show that as an average of all the reports returned on the valuation of the various farm crops, the cowpeas stand at the head of the list in acre value.

THE USE OF COWPEAS IN SOIL IMPROVEMENT.

As a soil builder, the cowpea has no equal for Missouri, where time is a factor. There is much the same benefit to the land to be derived from a crop of cowpeas, which requires but three months to mature, as there is from a crop of clover. Moreover, the effect of cowpeas upon the soil, not considered merely for the nitrogen which it adds, but the great improvement in the tilth, or friableness, in the soil is well known to all who have handled them. The beneficial effect on a corn crop following a cowpea crop is exceedingly striking, many reports having been received at the Experiment Station of an increase in corn yields from this cause ranging from five to twenty bushels per acre. On the soil experimental fields of the Experiment Station, which are located in the various parts of the state, the increase in the yield of crops following a crop of cowpeas is very striking.

For the man who has a run-down piece of land, therefore, which he wishes built up, or a piece of land which is naturally thin, there is no more rapid method to increase the fertility than in the growing of cowpeas. This is particularly true, since the cowpeas are grown on thin land better than any other crop unless it be buckwheat, millet or sorghum, and while these crops are very hard on the land, the cowpea has the opposite effect and is a great benefit.

FEEDING VALUE OF COWPEAS.

As a feed, the unthreshed cowpea hay ranks next to alfalfa. It is particularly high in protein, and where properly cared for gives one of the cheapest feeds for the modern farm. This is especially true since the yield per acre from cowpeas is ordinarily more than clover, while the feeding value also ranks above it. The following table shows the digestible nutrients found in a number of our most common forage crops:

Digestible nutrients from different crops.

Material.	Protein per cent.	Digestible nutrients per 100 lbs. carbohydrates.	Fat per cent.
Cowpea hay	10.8	38.6	1.1
Clover	6.8	35.8	1.7
Alfalfa	11.0	39.6	1.2
Timothy	2.8	43.4	1.4
Wheat bran	12.2	39.2	2.7
Corn	7.9	67.7	4.3
Oats	9.2	47.3	4.2
Cowpeas (grain)	18.3	54.2	1.1

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It will be seen from the table that the unthreshed cowpeas are only very slightly below alfalfa in digestible nutrients, and with the exception of the fat content, it compares very favorable with wheat bran. It contains almost four times as much digestible protein as timothy hay, thus emphasizing its value as compared with this crop, especially as a feed for young stock.

Experiments in the feeding of cowpea hay in comparison with other feeds have been repeatedly made at the Missouri Experiment Station, and the following tables show the results of some of these trials:

Comparison of cowpea hay with timothy hay for wintering yearling steers.

* First trial—1899-'00; 104 days, four steers in each lot, four pounds of corn per day per head.

Kind of feed.	Corn eaten.	Hay eaten.	Total gain.	Average daily gain.	Grain per lb. gain
Corn and timothy hay...*lbs.*	1,568	6,536	260	.64	6.00
Corn and cowpea hay....*lbs.*	1,568	7,757	624	1.54	2.51

Second trial—1900-'01; 80 days, four steers in each lot, six pounds of shelled corn per day per head.

Kind of feed.	Corn eaten.	Hay eaten.	Total gain.	Average daily gain.	Grain per lb. gain
Corn and timothy hay...*lbs.*	1,926	4,543	318	1.00	6.06
Corn and clover hay.....*lbs.*	1,926	5,719	640	2.00	3.01
Corn and millet.........*lbs.*	1,926	3,941	119	.37	16.10
Corn and sorghum hay...*lbs.*	1,926	4,727	166	.52	11.60

Comparison of cowpea hay with clover and timothy hay for fattening steers.

* First trial—1899-'00; 119 days, four 2-year-old steers in each lot, full fed on shelled corn.

Kind of feed.	Corn eaten.	Roughness eaten.	Total gain.	Average daily gain per steer.	Grain per lb. of gain.	Gain per bu. of corn.
	bu.	*lbs.*	*lbs.*	*lbs.*	*lbs.*	*lbs.*
Corn and timothy hay.......	166	3,813	802	1.69	11.51	4.87
Corn and cowpea hay.......	188	3,662	1,257	2.64	8.31	6.74

Second trial—1900-'01; 105 days, four 2-year-old steers in each lot, full fed on shelled corn.

Kind of feed.	Corn eaten.	Roughness eaten.	Total gain.	Average daily gain per steer.	Grain per lb. of gain.	Gain per bu. of corn.
	bu.	*lbs.*	*lbs.*	*lbs.*	*lbs.*	*lbs.*
Corn and timothy hay......	157.5	2,540	789	1.97	11.19	5.00
Corn and clover hay.......	176.2	4,768	1,135	2.84	8.69	6.44
Corn and cowpea hay......	175.3	4,783	1,134	2.84	8.65	6.47

In the first of these experiments it will be seen that the substitution of cowpea hay for timothy more than doubled the gain, while in the other trials the gain where cowpea hay was fed is very much greater than in the case of timothy hay. It will be seen that the steers made nearly 50 per cent better gains where the cowpea hay was used.

The difficulty on the average Missouri farm in wintering stock, is that they are fed foods containing too much of carbohydrates for the protein which they receive. The use of timothy hay and corn fodder should always be accompanied by foods such as cowpeas or clover in which the protein content is high, and where these are not available it will usually pay to buy concentrated nitrogenous foods such as oil meal, cottonseed

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* Circular of information No. 11, Missouri Experiment Station.

meal, etc. On most Missouri farms, however, this protein can be supplied in crops like cowpeas or clover, more cheaply than it can by using the commercial feed stuffs. With proper care, considerably greater yields can be secured from cowpeas than with clover, and they contain a slightly higher protein content. It will be seen, therefore, that where peas can be handled conveniently they will frequently be a more remunerative crop for the farmer to grow than the clover. Clover has its place, especially in the regular rotation of crops, and cowpeas should not necessarily supplant it except in regions where clover has begun to fail. In such regions the wide use of cowpeas can not be too strongly recommended.

THE ADAPTATION OF COWPEAS.

The cowpea is a native of the South. Consequently, the farther south in the state it is grown the better it is adapted to the climatic conditions. However, the cowpea is a perfectly reliable crop throughout the whole of Missouri, where it is intelligently handled, although it requires more care and usually earlier varieties, as well as somewhat later planting in the extreme northern part of the state to bring success, than it does in central and south Missouri. In the south third of Missouri, cowpeas are especially at home. The early spring and the long summers give exceptional conditions for its growth, and there is not nearly the same care necessary in handling the crop in that region as there is in the north third of the state.

The cowpea can be grown on practically all soils. There are a few soils too thin for its profitable production, but on the richer soils it grows proportionately larger and more thrifty. As a matter of fact, on the best lands of Missouri, cowpeas tend to grow largely to vine and produce little seed. This makes them difficult to handle, and the lack of pods naturally decreases somewhat the feeding value. On very thin soils they tend to grow stalky and to produce little vine, although naturally the different varieties vary greatly in this respect. On soil that is very poor, the first year's growth of cowpeas is frequently rather insignificant, as they sometimes do not exceed ten inches in height and the yield is small. The second year's growth, however, makes a very great increase in size and thrift, while the continued production of them for three or four seasons on such land will bring surprising returns.

PREPARATION OF THE LAND FOR COWPEAS.

The preparation of the land for the cowpeas should be about the same as for corn. It is true that cowpeas can be sown on land which has not received quite as thorough preparation as is usually given for a corn crop, but much depends upon the season following as to the results obtained. The experiment station has occasionally practiced the sowing of cowpeas on wheat stubble by simply double-disking and then drilling them in. This, however, is limited to seasons of abundant rainfall and to stubble that is fairly clean of weeds. As a rule, it is best to put the land in good condition before sowing cowpeas.

Cowpeas may follow any crop which can be removed by the middle of June, such as wheat, oats, clover and in some cases, early potatoes, while of course, they may follow corn readily. Land may be plowed late for cowpeas without any great risk, provided the season is ordinarily favor-

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able. If there is enough moisture in the ground to give the cowpeas a good start, they will thereafter grow steadily unless a very severe drought should interfere. Cowpeas will stand more dry weather after they are once well started than any other leguminous crop common to Missouri, with the exception of alfalfa. They do not require nearly the amount of water that a crop of corn requires, and for this reason the ground may be plowed very late and put into condition for cowpeas.

Farmers frequently inquire regarding simply disking the stalk land in preparing it for cowpeas, but this is not to be recommended. It would be perfectly possible to get the land sufficiently prepared by this means, but cowpeas can not be safely sown in Missouri before the last week in May or the first week in June, and consequently it would require repeated disking of the stalk land to keep down the weeds until that time. A much better practice where one wishes to follow corn with cowpeas, would be to sow rye, wheat or barley in the stalk land in the fall and pasture this during the early spring up until May, then replow and sow to cowpeas. Of course, one may simply replow the stalk land along in April, as is commonly done in preparation for corn if the rye or other pasture crop can not readily be sown in the fall, but since one must plow the land anyway, and since this plowing may be well postponed until May, it is greater economy to have a pasture crop on the stalk land to prevent winter washing and to give spring pasture.

SEEDING.

There are various methods of seeding, and the method to pursue depends upon various factors. Ordinarily for hay, cowpeas are best drilled with a grain drill, using the oat cups, and sowing four or five pecks per acre. It frequently pays, on average seasons, to sow more than this, some men putting in as much as two bushels. This, of course, makes the hay finer and the increased value of the product is often more than the cost of the extra seed. However, if the season is favorable, with an abundant supply of moisture, and especially if a medium trailing variety of peas is used, three or four pecks is usually ample. In fact, under very favorable conditions every other cup of the grain drill may be stopped and the drill set to sow five pecks per acre, thus seeding at the actual rate about 2½ pecks and practically as good results secured as with heavier seeding under less favorable conditions.

There is some difficulty in sowing a large-seeded variety of peas with the grain drill as many drills tend to crack them badly in the cups. This, however, is not a very serious matter where the cups are opened up to sow as much as four or five pecks per acre.

Peas may be drilled with the corn planter at the width of corn rows and cultivated. This practice is followed to a considerable extent in some sections of the state, but for a hay crop this is not usually so satisfactory as putting them in with a drill. Where planted in this way, a peck of seed will cover an acre, and it is thus a great saving in cost of seed, but this is off-set by the expense of after-cultivation. When peas are sown this way for hay, they are also considerably more difficult to cut with the mower, since they fall down badly and the ground being ridged by the cultivation, makes it almost impossible to handle them satisfactorily with

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the ordinary mower. There is a device on the market, however, consisting of large teeth, which are fastened on to the cutterbar, and project out ahead for several inches for the purpose of lifting up the cowpea vines and allowing the cutterbar to run under. It is usually necessary to use this device on rowed peas if the harvesting is to be done with any degree of satisfaction.

Peas are frequently drilled with the corn planter, straddling every other row, "double rowing," as it is called. This places the rows from twenty to twenty-two inches apart, depending upon the width of the corn planter. On soils that are exceptionally clean and where the planting is done rather late, so that there is little danger of weeds, this practice works fairly well, but peas planted with rows so close together can not be cultivated with any degree of satisfaction. In the first place, it is impossible to drive straight enough to keep the rows the same distance apart, and unless one uses a narrow gang cultivator some of the peas will be plowed up. In the second place, the wheels of the cultivator usually run on two rows, while the third one is being cultivated, and this is considerable injury to the plants. In certain sections, cowpeas are put in in this way, given about one cultivation and then the crab grass is allowed to grow, giving mixed hay of cowpeas and crab grass, which is not a bad combination for wintering cattle.

There is one precaution to be used in cultivating cowpeas, and that is to avoid cultivation when the dew is on. When the soil is thrown against the damp cowpea vines, it adheres and encourages the development of a fungus disease, which does considerable injury to the plant.

Another method which is frequently used for putting the cowpeas in rows is to take an ordinary grain drill and close all but two or three of the cups, thus placing the rows thirty or more inches apart. This is satisfactory, as a rule, where one wishes to cultivate them. As a matter of fact, thirty inches is about the right distance to plant cowpeas in rows where cultivation is to be given, and this can only be secured by the use of a grain drill in this way or by a one-horse single-row drill, or by remodeling a corn planter and setting the shoes at this distance.

Experiments at the experiment station have shown that it is only on exceptionally favorable seasons when broadcasting is equal to drilling. There is too great a waste of seed where broadcasting is practiced, and frequently an entire failure will result. It is usually necessary to allow about one-fourth more seed than where they are drilled.

Where cowpeas are handled for seed they should not be planted quite so thick, as a rule, as where they are handled purely for hay, but the season, the soil and the variety have a great deal more to do with the yield of peas than does the thickness of planting. As a matter of fact, in the sections of southeast Missouri where peas are grown so extensively for seed they are usually put in with a grain drill at the rate of three or four pecks per acre. As a general proposition, on the upland of Missouri, where one wishes a good growth of pods, it is best to select land a little below the average in fertility, and also select varieties like the New Era, Whippoorwill or Black, which are known to be good seed producers. In ordinary practice, one will find it desirable to sow the peas with the

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idea of securing hay and then thrash only on those seasons or those soils on which the yield of peas warrants it.

The time at which cowpeas may be seeded varies from the first of May until the middle of July, depending upon the locality and season. As a rule, cowpeas over most of Missouri are sown too early rather than too late, and this has been responsible for a great many failures in cowpea growing. In central and north Missouri, especially, cowpeas should not be sown before the last week in May, and usually the first week in June is early enough. In the southern part of Missouri they may be sown a couple of weeks earlier, but even there it is about as well, and many men think better, to wait until the first of June before sowing. Where cowpeas are sown at the same time corn is planted, and a cool week of wet weather follows, as frequently happens, the cowpeas are stunted and never recover their full vigor.

The difficulties in sowing cowpeas very late are the lack of moisture and the failure to get them matured before frost. With early varieties, however, like the New Era, and with a reasonable amount of rainfall, they may be sown as late as the middle of July, in central Missouri, and a good hay crop secured. In north Missouri the first week in July is about as late as they should be sown. For green manure, where one does not expect to harvest the crop and where the season is reasonably moist, they may sometimes be sown in central Missouri as late as the last week in July, but this is not generally to be recommended except for the extreme southern part of the state. The difficulty in getting enough moisture to start their growth is the important factor in this case.

HARVESTING.

The harvesting and curing of cowpeas has been one of the most serious difficulties encountered by the grower. When cowpeas are cut for hay they contain a great deal of water, the stems are fleshy, and it takes several days of good weather to properly cure them. Too often a rain will come before they are cured, and this causes the leaves to drop off badly, resulting in a poor product. Peas, as a rule, can not be cured most perfectly in the swath unless the weather is exceptionally favorable. It is much better to let them dry for a couple of days, then rake into light windrows and allow them to finish curing in that way or to place them in tall, narrow shocks and allow them to stand for two or three weeks. Where they are cured in the windrows, a side-delivery rake is almost essential to their proper curing. With this implement they may be turned over every couple of days until thoroughly cured, and this is especially necessary where rain falls during the curing period. Where the peas are very trailing, some trouble will be experienced in handling them with a side-delivery rake, or with any rake, for that matter, but with the general purpose varieties, this will not be of material consequence.

Peas should be cut for hay about the time the first pods begin to ripen. If cut earlier than this, they are usually too sappy to cure into good hay. Where seed is desired, cutting should, of course, be delayed until most of the pods begin to ripen. This will not give quite such a good quality of hay, but where they are properly cured this difference is of little consequence.

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In some parts of the state the cowpeas are baled directly from the shock and sometimes from the windrow. This is perfectly practicable where they are well cured and where the weather is favorable, but one must avoid baling them with any amount of moisture in them, as in the case of clover. Where peas are thrashed it is a common practice to run the straw directly from the thrasher into a baler, and this baled straw or vine makes exceptionally good feed, even if the peas have been removed. It has a feeding value about equal to that of clover, and the shredding action of the thrasher gives it a fine texture.

Cowpeas may be stacked in tne field very satisfactorily just as clover hay is stacked, but they will not keep well unless the stack is covered either with some sort of hay, such as timothy or wild grass, or with some special covering.

THRASHING.

A good deal of difficulty has been experienced in thrashing cowpeas, in preventing cracking. This is especially true of the larger seeded varieties. The ordinary wheat thrasher when run at the regular speed for thrashing wheat, will so crack the larger seeded varieties of cowpeas as to make them practically useless for sowing. The result has been that manufacturers have spent a good deal of time perfecting a huller, or so modifying the wheat thrasher that peas may be thrashed without cracking. It has been found that where the speed of the cylinder in the ordinary wheat thrasher is decreased to about seven or eight hundred revolutions per minute, or where a part of the concave teeth are removed, cowpeas may be handled with the proper arrangement of sieves and very little cracking results. This is especially true of the smaller seeded variety of peas, such as the New Era. It is more satisfactory, however, to use a regular pea huller for this purpose, and a number of companies now have these on the market.

Cowpea hullers have a slow speed of the cylinder and have the distance between the cylinder and concave teeth widened so that the peas will not be cracked. They require a slightly greater horse power to operate than does the ordinary wheat thrasher, on account of the heavier vines of the cowpeas and the slower speed of the cylinder. A number of these have been introduced into Missouri, and their use is rapidly increasing. The use of pea hullers should be greatly encouraged on account of the possibilities of securing seed at a less cost when this method of handling them becomes common. The old method of picking the peas by hand and then flailing them out is still practiced to a certain extent, but it is too expensive for the large farmer. A man who wishes but a small amount of peas can handle them in this way about as cheaply as any, but it is usually restricted to the man who handles small areas.

THE PLACE FOR COWPEAS IN THE ROTATION.

As has already been mentioned, cowpeas may follow corn readily, or they may follow any crop which comes off by the middle of June. Where they are to form a regular crop in the rotation, however, the ground should be prepared thoroughly, usually during May, and the peas seeded about the first of June.

A good rotation where cowpeas are used as a regular crop is one con-

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sisting of corn the first year, cowpeas the second, wheat the third, and clover the fourth. In this rotation, rye, wheat or barley may be seeded in the corn in the fall or late summer to prevent winter washing and to give spring pasture. This may be pastured during the winter and spring, plowed under during May, and the land sown to cowpeas, which can then be harvested early enough to seed the land to wheat in the fall. It will not be necessary to replow the land after cowpeas if they are reasonably clean of weeds, as a disk or spring tooth and drag harrow will usually put the land into good condition for wheat. Wheat does not do well after peas in some cases, due to causes not entirely understood, but partly because the peas leave the land most too loose for wheat. In such cases a roller should be used to give it greater compactness. Clover should, of course, be seeded on this wheat ground in the spring and harvested as a regular crop the fourth year.

Where more corn is desired in the rotation, corn may follow corn the second year and this be followed by cowpeas, wheat and clover, as suggested above. This will make a five-year rotation, and where the land is in corn two years in succession it will be possible to seed cowpeas in the corn the first year to be pastured off by hogs or sheep, and then to seed rye the second year for spring pasture. Where a larger amount of hay is desired, clover and timothy can be mixed and allowed to stand two years, thus giving mixed clover and timothy hay, rather than clover alone.

These rotations have the advantage of two or three legume crops in every round of the rotation, in addition to the regular grain crops. They are especially adapted, therefore, to lands of rather low fertility and systems of live stock farming.

SOWING COWPEAS IN CORN.

The use of cowpeas in the corn as a pasture crop for hogs or sheep is coming into considerable prominence in Missouri. They are either drilled in at the same time corn is planted, or they may be seeded at the last cultivation of the crop. Where drilled in with the corn they may be mixed in the planter box or they may be put in with a special device which is now on the market for sowing cowpeas from a separate hopper at the same time the corn is being planted. When sown with the corn in this way it is usually necessary to use an early variety of corn and plant it late, about the last of May, if the best results are to be secured. Many men are practicing this system and then hogging the whole down. It has been found that a mixture of cowpeas and corn hogged down in this way is a cheap way of making pork. This method has the disadvantage of not allowing a very uniform stand of corn unless the special cowpea planting device be used, and also it necessitates a somewhat later planting than is usually thought best, although some men are practicing sowing the peas with the corn at the usual time of planting, with generally good results. It has the advantage of getting a more uniform stand of peas and bringing a larger production of pods. The best varieties for this purpose are those that vine enough to climb the corn stalks, and those to be recommended are the Black, Clay and Red Ripper. They will not interfere seriously with cultivation. and the whole may be cut with a corn binder, or they may be pastured out with sheep. The rate to sow is best indicated by saying that about 1½ peas should be used to each kernel of corn. The proportions for the peas of various sizes can readily be determined by counting the number of kernels of corn and the number of peas in a small measure of each, as a baking powder can lid level full, and then calculating the amounts to sow.

Where cowpeas are seeded in corn at the last cultivation they are usually sown broadcast at the rate of two to three pecks per acre. Experiments made by the experiment station, however, show that for central and north Missouri it is much better to seed these peas with a one-horse drill than to broadcast them. When drilled in this way they should be sown at the rate of two to three pecks per acre. The advantage of this method lies in the fact that corn may be planted at the regular time and given thorough cultivation. The disadvantage lies in the difficulty in getting a good stand of cowpeas, due to the dry weather which frequently prevails at that season of the year. It has also been found that where the corn is rank, and where sowing is delayed a few days after the last cultivation, that the resulting shade so retards the growth of the cowpeas that a satisfactory growth can not be secured. Where this method is used, therefore, the corn should be laid by a little earlier than usual and this drilling in of the cowpeas may serve as the last cultivation. The best implement for sowing is a one-horse drill from which the outer disks or hoes have been removed, thus putting three rows in each middle. There is too much injury to the corn roots if these are left on. The best variety for this purpose is usually the New Era, although the Whippoorwill and the Black are also good. The variety should be one of medium early maturity, and one that does not tend to vine much.

It has been found by the experiment station that cowpeas sown in the corn in this way act to a certain extent like weeds, cutting the yield of corn from two to five bushels because of the moisture they consume. This is especially true in dry seasons, but in seasons of reasonable rainfall it has less effect. On average uplands it is rarely possible to get the highest yield of corn and have cowpeas sown between the rows, but the value of the peas more than offsets this. On the bottom lands of southeast Missouri this retarding action of the cowpeas does not seem to take place, many men declaring that corn with cowpeas sown between the rows will do better than where no cowpeas are used. The reasons for these differences of opinion are not quite evident, but it can be said that the great benefit to be derived from sowing cowpeas in the corn in this way both to the land and also from the resulting pasture warrants their very wide use in this manner. This is especially true with the present high price of corn, since the addition of cowpeas to the hog ration when handled in this way makes the corn go very much farther. It is one of those practices which is coming into use with a more intensive system of agriculture. Many men are now using cowpeas in the corn in this way for a sheep pasture. It has been found that sheep will clean up the cowpeas and lower blades of the corn with little injury to the ears; or if left on longer the corn will be entirely consumed. Both methods are practiced with lambs or western sheep with good results.

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SOWING COWPEAS AFTER WHEAT.

Cowpeas may be sown after wheat or oats with good results where these crops can be gotten off the ground early. Thousands of acres of cowpeas are sown after wheat in the bottom lands of southeast Missouri, but in this region the land is sandy and can be quickly turned, while the seasons are long. In central Missouri it is usually necessary to either get the wheat off the ground or it may be thrashed from the field early so as to allow the land to be plowed by the last of June, in order to get them in in sufficient time. This, therefore, restricts the sowing of cowpeas after wheat in north or central Missouri to rather small areas; moreover, most farmers follow wheat with clover or timothy, which, of course, prevents the sowing of cowpeas. Cowpeas may also be sown after oats, especially where the oats are cut in the milk for hay, as this gets them off the ground in sufficient time.

Where cowpeas follow either wheat or oats there is frequently trouble in getting the land broken on account of the land being hard and dry at that time. It is usually necessary, however, in most parts of Missouri to rebreak the land after these crops, although, as has been already mentioned, in seasons of abundant rainfall, when the ground is soft at harvest time, it is sometimes possible to go in and prepare the ground by double disking. This is, however, limited to rather exceptional seasons. The variety of peas to use where sown as a late crop in this way, is usually one of the early sorts, like the New Era.

COWPEAS FOR GREEN MANURING.

The use of cowpeas as a green manure crop for the building up of organic matter in the soil is one which is sure to become more common as our lands decrease in their organic-matter content. The fact that it is a crop that can be thrown in after other crops without very much expense, and which will mature in a short time, makes it especially valuable for this purpose. Care should be taken, however, in plowing in a crop of cowpeas in the fall, to be followed by a crop like wheat, to plow them early enough to allow of considerable decay before the wheat is sown. It is usually necessary, also, to roll the land in order to give it sufficient compactness, and if it can be chopped up some with a disk before plowing this is advisable.

In using cowpeas as a green manure or a pasture crop it has been found that on lands where clover fails to grow, this is one of the best methods of making clover growth possible. In fact, a couple of crops of cowpeas, either pastured off or plowed under, and then followed by a wheat crop in which clover is seeded, will go a long way towards insuring a clover stand. The time is coming, too, when a number of our farmers will undoubtedly turn to the use of cowpeas and clover to be plowed under, in order to maintain the supply of organic matter rather than to depend entirely upon the feeding of crops back for this purpose. In other words, it is impossible for all farmers to handle large quantities of live stock, and we must make a wider use of legume crops of this kind to be plowed under if we are to continue to supply the world's demand for grain and at the same time maintain the supply of organic matter. The cowpea offers exceptional opportunities, therefore, for the man who

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is to farm his land to the best advantage, and it behooves every Missouri farmer to so study the character of this plant as to be able to handle it efficiently in his farm practice.

VARIETIES.

There are a great many varieties of cowpeas, differing greatly in their habits of growth. The earlier varieties are as a rule more stocky and stand more erect than the later varieties, which tend to vine. As a rule varieties brought directly from the south to Missouri tend to vine more than our native varieties, due to the conditions of growth in regions farther south. A variety grown in Louisiana, for instance, will vine considerably more when brought to Missouri than will the same variety where the seed is produced here. Varieties also vary strikingly in their seed production, the more stocky ones usually yielding more seed than the trailing sorts. From a practical standpoint there are, however, only four or five varieties which need be considered in Missouri because the seed of the other varieties is not commonly found on the market in this section.

The most common varieties grown in Missouri are the Whippoorwill, the New Era, the Clay, the Black and the Blackeye. The Red Ripper and the Iron are grown to some extent but are not general over the state. As a matter of fact, the two varieties first named make up the bulk of the seed appearing on the Missouri market.

THE WHIPPOORWILL cowpea is a medium maturing, rather stocky variety, which, however, on soils of fair fertility vines considerably. The Whippoorwills are, therefore, good hay peas and are grown very widely over the state. The seed is rather large, making them somewhat difficult to thrash on account of cracking, but where pea hullers are used, they can be handled with success. This variety is adapted to all sections of Missouri, and for general purposes one will not go far wrong in using it as a standard type. It produces a good amount of seed on lands of medium fertility, although on richer lands it tends to vine too much for profitable seed production.

THE NEW ERA cowpea is several days earlier in maturity than the Whippoorwill and is usually a heavier seed producer. It is, therefore, particularly adapted to sowing as a catch crop, where it must be put in late, and is especially valuable for a hog pasture on account of the large amount of seed produced. The peas are small and rather hard, so that they will handle very much better in thrashing than the larger type. The peas are a bluish gray in color when perfectly pure, although strains of New Era with a brownish seed occur frequently on the market. It is very common, also, to find these two colors of peas in the same field. The peas are erect on average soil, but vine considerably on soils high in fertility. They have not, as a rule, a bunchy appearance like the Whippoorwill, and make somewhat smaller stalks. They are valuable for a hay crop where one wishes to put them in late.

THE CLAY peas are later than the Whippoorwill and tend to vine considerably more under the same conditions. They produce only a fair amount of seed except on the thinner lands, and are, therefore, adapted

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more particularly for green manuring or for a hay crop. The seeds of this variety are of medium size and of a salmon yellow color.

THE BLACK cowpea is a pea resembling the Whippoorwill in general character of growth, but produces more seed. The seed is of a jet black color and of medium to large size. They are used quite commonly in some sections as a general purpose pea. They are also good for planting with the corn in the row.

THE BLACKEYE cowpea is the variety commonly used for table purposes in the south. They will produce a good amount of seed and are of a medium stocky growth, well adapted for hay or for hog pasture. They are of medium maturity.

THE RED RIPPER pea is used to a considerable extent in the low lands of southeast Missouri. It has a peculiar habit of resisting decay througout the fall and winter in that section, and of coming up voluntarily in the spring. It is, therefore, used to quite a considerable extent where a man wishes a piece of land for pasture, or, frequently, where corn is followed with corn, since it comes up in the corn naturally and saves seeding. This use of peas in corn is very common in the low land counties of the southeastern part of the state.

THE IRON pea is a medium to late maturing variety with medium vine, but which stands up well. The peas are of an iron yellow color, somewhat darker than the Clay.

There are one or two other varieties that might be mentioned, such as the Groite, a cross between the Whippoorwill and the New Era, and partaking somewhat of the character of each. It is a good general purpose pea and has become quite popular in some of the Atlantic states. It is not grown to any extent in Missouri, but tests at the experiment station have shown it to be a very valuable variety for Missouri conditions.

The Michigan Favorite, a pea that has been used quite extensively in the north, has also given good results at the experiment station and is worthy of trial, especially for north Missouri.

Mixed peas are commonly quoted on the market as "mixed," and as these are cheaper than the pure varieties they are often most economical to use for green manuring or even for hay.

EFFICIENCY OF THE ROUND BARN.

From *The Homestead.*

The round barn, which a half score of years ago was derided and scoffed at, is rapidly gaining in popularity on account of its all-around utility and adaptability to practically every line of farming from exclusive grain production to general live-stock farming. When a country man is convinced that he can save from thirty-four to fifty-eight per cent of the cost of a rectangular barn by constructing a round barn of quite similar area he usually becomes decidedly enthusiastic about this unique building, other things being equal. Great credit is owing to the Illinois agricultural college for its commendable and, in the main, successful efforts in popularizing the round barn. Especially in the dairy districts of north-

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ern Illinois and southern Wisconsin has the round barn met with particular favor, as the fact that it permits of having the silo centrally located and in this way minimizes feeding labor strongly appeals to the overworked milk farmer.

Probably one of the most active opponents of the round barn is community custom, which in certain districts has favored the erection of one special type of barn to the exclusion of all others; square, rectangular, pentagonal, and even octagonal-shaped structures for the accommodation of the farm animals, and the housing of the grain and roughage have been the result. In barn building as in farming the general country man is much more willing to follow custom than to attempt to deviate from locality dictate and to build a barn which would be an innovation for his district. However, this lack of inclination to adopt a new idea simply because it is new is gradually being overruled; all that is necessary to popularize the round barn in a certain neighborhood is to have one farmer build a practical structure of this character and if it proves a success in less than no time all the farmers thereabout are talking round barn.

The Illinois authorities have conducted innumerable tests pertaining to the efficiency of the round barn; they have built two of these barns on the grounds of the college farm, and for several years have utilized them with great success as quarters for live stock and to provide storage room for grain and hay. The results of their detailed investigations show that the circular structure is much stronger; that the rectangular form requires twenty-two per cent more wall and foundation to inclose the same space; and that the cost of material is from thirty-four to fifty-eight per cent more for the rectangular building. The round barn offers greater convenience in storing, handling and distributing the feed while much greater strength is secured with less lumber than is possible in the case of the rectangular building.

In the early days when lumber was dirt cheap it was only natural that the rectangular structure should predominate in popular opinion but nowadays when timber is scarce and therefore expensive the country man is gradually being forced into accepting the circular barn on account of the fact that it can be built at so pronounced a saving in material. The noteworthy point about this matter is that once a farmer owns and uses a round barn he will never thereafter be satisfied with any other building. The trouble with most round barns which have been constructed in the past is that they were not provided with self-supporting roofs. They usually were equipped with straight roofs, which necessitated numerous supports in the barn below, and were both costly and inconvenient. The dome-shaped, self-supporting roof in use to-day does away with these defects, and in addition nearly doubles the capacity of the mow.

Another objection to the round barn where the owner does not carefully study the proposition before building, is that he is liable to build a structure of too great a diameter and as a result have lots of waste space in the building. Circular barns ranging from sixty to ninety feet in diameter are very practical; they will accomodate as many as one hundred dairy cows with space to spare. However, when one builds a barn of greater diameter his wisdom is to be questioned because with round barns

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large enough for two or more rows of cows the row headed out does not utilize the space as economically as in the case of the rectangular barn, as a cow needs more width at the rear of the platform than at the manger. Where there are two rows of cows, the inner row is usually headed out, and as only about one-third of the cows are in this row, this loss of space is counterbalanced by the large number of cows in the outer circle using the space more economically than they do in the rectangular barn.

Naturally a round barn can not be so readily enlarged as one of rectangular construction, but this difficulty is overcome by the fact that the circular structure may be built higher to the eaves, thus allowing for an extensive growth in the size of the herd by providing for stables in the second story should the occasion for a larger barn arise. This plan also provides sufficient room for the hay mows and granary on the second floor. The popular supposition that a round barn is difficult to light is erroneous, as with the same number of windows the light is more evenly distributed in a circular barn and during the winter the sun can directly shine into some portion of the stable at all hours of the day. A final objection that rectangular objects can not be placed in a circle without a waste of space in no way applies to the circular dairy barn, as the storage of hay and grain depends upon cubical content of the building irrespective of its shape.

The essential advantages of the round barn are convenience, strength, and cheapness, as was previously mentioned. Either a wooden, brick, or concrete silo is constructed in the center of the barn, as in this position it is of material importance as a support to the roof and in addition its central location minimizes the labor involved in feeding the succulent silage to the dairy matrons. Hay and grain may be fed quite as easily as the ensilage by arranging the grain and hay chutes so that they terminate near the silo in the central feeding alley in the basement. One practical dairyman who owns a round barn elevates his grain to the bins, which are located near the top of the structure, by means of machinery; by gravity the grain slides through chutes to the second floor, where it passes through a feed grinder; hence to the basement stable, where with little labor it is fed to the stock.

A second advantage is contained in the large unobstructed hay mow, where the self-supporting roof is employed. The hay carrier runs on a circular track located midway between the silo and the outside wall of the barn and permits of depositing the forkful of roughage at the desired point; the man in the mow never has to move more than a few feet at a time in moving away the hay in ship-shape fashion; this means another saving in labor. A third good point in the round barn is that in case a Gurler silo is built in the center of the building it is unnecessary to board it up on the outside, and on this account quite a saving in the gross cost of the silo is possible. The circular construction is by all odds the stronger, as it takes advantage of the lineal instead of the breaking strength of the lumber; each row of boards running around the barn really acts as a hoop to hold the structure together; the real strain comes on these hoops in the lineal direction, where the maximum strength lies.

In case the lumber is properly placed in a round barn much of it will perform two or more functions, as every row of siding boards surrounding the framework serves also as a brake; the same is true of the roof boards and the arched rafters. If the siding is put on vertically, and the roof built dome-shaped, no scaffolding is required inside or outside. In order to infallibly impress the country man with the efficiency of the round barn the Illinois Agricultural College made a careful study of the proportional expenses involved in the construction of circular barns of different diameters as compared with correspondingly dimensioned rectangular buildings of both plank frame and mortise frame construction. Their results were somewhat as follows: The lumber for a round barn sixty feet in diameter with a cubical content of 117,669 feet cost $799.76, while the bill of material for a rectangular structure 36 feet wide and 78½ feet long, with a cubical content of 117,138 feet, amounted to $1023.27 where plank frame construction was employed, while it came to $1233.41 where mortise frame construction was used. The results in the case of a 90-foot circular barn as compared with a rectangular barn 36 by 176½ feet in dimension were quite similar, the round barn with a cubical content of 322,952 feet, costing $1628.48 for the lumber, while the rectangular form with a cubical content of 270,570 feet necessitated the use of $2007.67 worth of material where the plank frame construction was used and $2497.56 worth of lumber where the mortise frame method was followed.

THE USE OF PAINT ON THE FARM.

From Farmers' Bulletin No. 474, U. S. Department of Agriculture. By PERCY H. WALKER.

INTRODUCTION.

There is probably no one point more neglected by the average farmer than the judicious use of paint, not only on his house and outbuildings, but also on machinery and various agricultural implements. It is perhaps the rule rather than the exception in some sections to see houses and agricultural implements on the farm sadly in need of paint. The idea seems to be prevalent that paint is used solely for ornamental purposes, and its use is regarded as a luxury rather than a necessity. While paint does, of course, serve the purpose of improving the appearance of property, it is far more useful for protection than for ornament. A small amount of money and work expended in keeping a valuable piece of machinery properly painted will add greatly to the length of its life. The same may be said of buildings. Another useful object which is accomplished by painting is the improved sanitary conditions of buildings and outhouses. It is not proposed in this bulletin to give instructions for artistic painting, or even for doing the class of work which would be expected of a first-class master painter, for such work can not be expected of one engaged in another business. But any man can do an average job of painting, and can thereby not only improve the appearance of his place, but can add greatly to the durability of all articles painted. The cost of such work is small, the necessary equipment is not expensive, and with proper care will last a long time. An attempt will be made to give directions for the care of paint and the necessary tools

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used in its application and for the proper selection of different paints for various purposes, their preparation and application, and their approximate cost.

Certain terms will be used frequently with a somewhat restricted meaning, and they are therefore defined as follows:

A paint is a mixture of a pigment with a vehicle and is intended to be spread in thin coats for protection or decoration or both.

A pigment is the fine, solid material used in the preparation of paint and is substantially insoluble in the vehicle.

The vehicle is the liquid portion of the paint.

Bearing in mind these definitions, it is seen that while varnish is used very much in the same manner as paint, it could not be properly classified as a paint, because it does not contain any solid particles of pigment. On the other hand, whitewash, which is not ordinarily called a paint (largely because of its cheapness), would comply with this definition very well.

BRUSHES AND OTHER IMPLEMENTS.

The only absolutely necessary implements are brushes. Probably the most generally useful brush is a round one with bristles about 6 inches long. Oval brushes from 2 to 2½ inches wide are also very good for general use, and a great deal of painting is done with 4- or 5-inch flat brushes. Of these three types it is difficult to say which is the best, different painters having their own individual preferences. The advantage of a flat brush is that a greater amount of surface is covered at a stroke, with the disadvantage that the paint can not be as thoroughly rubbed in. On the whole, therefore, it is best to use a round brush. The 6-inch bristles are too long for proper working, and before being used a piece of cloth should be tied around the brush about 4 inches from the end of the bristles and 2 inches from the binding. As the bristles are worn off this sleeve or bridle, as it is called, may be pushed back, thus materially lengthening the life of the brush. For painting sashes and other small surfaces smaller brushes are necessary, the most satisfactory being the small oval brushes with a chiseled end. For varnishing, oval or flat brushes with somewhat shorter bristles are generally used. For the application of whitewash and calcimine a very much larger brush may be used, since these are applied lightly to the surface and are not rubbed in. A flat 8- or 9-inch whitewash brush may be used with practically as much ease as a smaller one.

In addition to the paint brushes, dusting brushes made of stiff bristles are useful for cleaning the surface before painting. For cleaning rusted metal surfaces, steel-wire brushes (2 or 3 inches wide and 6 inches long with wires about 3 inches long) are frequently necessary.

If ready-mixed paints are bought the cans may serve as buckets, but if the paint is mixed from the paste a strong tin bucket large enough to allow for stirring the paint will be necessary. Scraping knives and putty knives are necessary tools for the painter, and it is well to have one or two of each, but a very good scraper can be improvised from a piece of sheet iron, and an old kitchen knife may be ground to a square end and converted into a very serviceable putty knife. A paint strainer

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is useful, but two thicknesses of cheesecloth tied over the top of a bucket answers practically as well. Paint should be strained before using it.

CARE OF BRUSHES.

Brushes for applying oil paints must be well cleaned after using, though for keeping overnight it is generally sufficient to wrap them in several thicknesses of paper. Some painters keep their brushes overnight by putting them in water. If, however, the brush is not to be used for several days, the paint should be washed out of it. Turpentine is one of the most satisfactory materials for washing a brush, but it is expensive, and a brush can generally be washed as well with kerosene, which is much cheaper. After washing off the paint with kerosene the brush should be rinsed with gasoline or benzine, then thoroughly shaken and well washed with soap and warm water. As soon as this washing is complete the brush should be shaken thoroughly so as to throw as much water out of it as possible and hung up with the bristles down to dry; when dried the brush should be thoroughly protected from dust. If much painting is being done it is less trouble to keep the brushes in turpentine or kerosene. For this purpose hooks should be fastened on the inside of a pail with a close-fitting cover, the brushes being suspended either by holes in the handles or by loops of string, so that the brushes hang in the kerosene or turpentine in the bottom of the pail. The bristles should be submerged in the liquid, but should not touch the bottom of the pail. If kerosene is used for cleansing, it should be removed by shaking the brush and rinsing it in turpentine before using again with paint. Brushes used with whitewash or calcimine should simply be washed and not put in the same liquids in which the brushes used for oil paints are kept. If a brush has been used for shellac varnish it should be kept in alcohol or in the varnish itself. In general a varnish brush may be kept in the varnish in which it is used.

DRYING OF PAINTS.

Water paints such as whitewash and calcimine dry in the ordinary sense; that is, by evaporation of the liquid, which in the case of the two paints mentioned is water. The drying of oil paints, however, is quite different, and in order to understand this attention must be drawn to certain peculiarities of the so-called drying oils. Suppose four plates of glass are coated, one with a thin film of water, another with gasoline, another with a heavy mineral oil, and another with linseed oil, and all four plates are exposed to the air for several days. The water and gasoline will evaporate and leave the plates dry and practically in the condition in which they were before applying the liquid. The plate covered with the heavy mineral oil will be found to be greasy, while the plate covered with linseed oil will also have a coating on it, but this coat will first become tacky and finally set to a hard, varnish-like film. If this experiment is tried with other vegetable oils, such as olive oil, it will be found that some of them behave very much like the mineral oils; that is, there is very slight tendency toward the formation of a coating. Other oil, such as corn and soy bean, will behave in a manner similar to the linseed oil; that is, there will be the formation of a more or less tacky mass, with perhaps the final formation of a varnish-like material. None

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of the other common oils, however, will form the varnish-like coating so rapidly, nor will the coating be so hard as in the case of linseed oil.

Oils which behave like linseed oil are called drying oils. It will be seen from this illustration, however, that the term "drying" as applied to oil is not similar to the drying which takes place on the exposure of a material wet with water to the dry air. The drying of a substance wet with water is really the removal of the water by evaporation. The drying of a drying oil is a change taking place in the liquid. This change is accompanied by an absorption of oxygen from the air, and the drying does not take place in the absence of oxygen. It is hindered by moisture and hastened by sunlight.

The formation of this varnish-like film by the so-called drying of linseed oil is an exceedingly important operation in the drying of oil paints. Certain substances, compounds of lead and manganese, if dissolved in the oil, hasten drying. Boiled oil which contains compounds of lead or manganese, or both, will dry more rapidly than raw linseed oil. Instead of using boiled oil, however, the drying of the oil in paints is generally hastened by the addition of liquids known as driers. These liquids are composed of compounds of lead and manganese generally thinned with either turpentine or benzine, and are known as japan or japan driers. As before stated, while the use of a drier is necessary in a great many paints, the amount used should be small. It is a rather astonishing fact that many driers, if used in small proportions, will very materially hasten the drying of the linseed oil; whereas if a large amount of drier is added, the drying of the oil is retarded. There is another objection to the use of a large amount of drier, and that is that the film produced is not so durable as one produced by raw linseed oil alone or by the use of a raw oil containing the proper amount of drier. There are a number of other oils which have the property of drying like linseed oil, but none of them is the equal of linseed oil for a paint vehicle.

Bearing in mind these facts, it is seen that an oil paint would consist of the pigment mixed with a drying oil, preferably linseed oil, and generally with the addition of a drier. Some pigments, however, have the property of hastening the drying of linseed oil, and when they are used (red lead, for example) it is unnecessary to add any other drier. The varnish-like film left by linseed oil is for practical purposes insoluble in water. It is not, however, impervious to water. If a bright piece of iron covered with a coating of linseed oil, and afterwards thoroughly dried, is exposed to moisture it will be found that while the iron will not rust so fast as uncoated iron, the rusting will take place to a considerable extent. Other experiments can be performed which will demonstrate that moisture passes through this film with comparative ease. But, if an oil paint is employed—that is, a mixture of pigment and linseed oil—it will be found that the water does not penetrate through the film so rapidly as it does through the linseed-oil film alone. Also the paint film is more resistant to mechanical abrasion. While there is some difference of opinion among experts as to the amount of pigment which should be used in a paint, it is generally considered that the greater the amount of pigment the more resistant the paint film is, provided all the particles of pigment are thoroughly covered with the oil. It would appear, therefore,

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that a film of oil, while it may seem to be homogeneous even if examined under a high-power microscope, is really porous, and by mixture of the oil with the pigment the pores are more or less completely filled, thus making a more impervious film.

In addition to the linseed oil and drier, paints frequently contain volatile substances, such as turpentine and benzine. The addition of these is largely for the purpose of thinning the paint to a better working consistency, so that it can be spread in thin layers more easily. These volatile substances evaporate almost completely and do not remain behind in the dried film. The only substance remaining which binds the solid particles of the pigment together is the oil.

PREPARATION OF SURFACES FOR PAINTING.

All surfaces should be clean and as dry as possible before the application of an oil paint. Much new wood is very difficult to paint. The resins in such woods as yellow pine and spruce tend to destroy any paint that is laid over them. When possible, it is well to allow a new house to stand unpainted for at least six months or even a year after the woodwork has been completed. By this exposure to the weather the resins are brought to the surface and are either washed away or hardened, and the resulting wood surface is in much better condition for painting than is a new structure. . An unpainted house, however, is an unsightly object, and it is often desired to paint a new house at once. Painters adopt several methods of treating new wood; probably the one most universally used is to coat all knots and other places where resin appears with shellac varnish, a solution of gum shellac in alcohol. Another plan is to mix with the priming coat of paint a small amount of benzol (coal-tar naphtha), which is claimed by some excellent authorities on painting to dissolve the surface layer of resins and allow the paint pigment to penetate into the fibers of the wood, preventing the final forcing of the resins to the surface. After applying the priming coat, all nail holes and cracks should be well filled with putty pressed in hard. Filling in with putty should not be attempted before the priming coat is applied, as it is not likely to stick as well.

In painting iron surfaces all rust and grease should be carefully removed, scraping the surface down to bright metal with wire brushes or sandpaper and finally dusting off all adhering particles.

Painting should be done in warm, dry weather. It is much better to select the summer time for painting than the winter. Not only does the paint not flow so well in cold weather, but the surfaces of the painted objects are more likely to be moist, and a little moisture underneath the paint film, either on wood or iron, is very apt to cause serious trouble.

PAINTING EXTERIOR WOODWORK.

All wood is more or less porous, and the natural result of applying a substance like paint to such a material is that the liquid portion sinks into the wood and leaves a large portion of the solid material on the surface. Also, different parts of the wood will differ in porosity, and there will tend to be different amounts of paint left on different portions of the surface. In order to do a good job of painting it is practically always necessary to apply several coats to new wood. The first or

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priming coat is made thinner than the others, the amount of thinning depending upon the porosity of the wood. For ordinary pine, a paint of proper spreading consistency, when mixed with an equal volume of raw linseed oil, generally furnishes a good material for priming. With very porous wood, such as redwood, more oil may be added. The priming coat should be applied with as much care as any other and should be thoroughly brushed into the wood, the brushing being carefully done so that the paint is evenly distributed, with no tendency to run. It is the custom of many painters to add a great deal of drier and of turpentine to the priming coat, and to apply the other coats almost immediately after finishing the priming. This is not good practice. The paint for priming should consist of the pigment, linseed oil, and a minimum amount of drier, with no turpentine or benzine; and after applying it at least a week and preferably longer should elapse before putting on the second coat.

Three coats at least are generally necessary to make a good piece of work. The effect of the priming coat, if properly applied, is to fill the pores of the wood and furnish a foundation on which to apply the subsequent coats. Owing to the different porosity of different parts of the surface, it is almost impossible to completely fill with one priming coat, and an attempt to get a good effect by applying the finishing coat immediately on top of the priming generally results in failure. A second coat will not penetrate to any very great extent into the wood. It should not, however, dry with a gloss, because a glossy surface does not furnish a good foundation for the next coat. In order to prevent the gloss, most painters add turpentine to the paint for the second coat; the amount used, however, should be small—to each gallon of paint about a half pint of turpentine in hot weather, or a pint in cold weather, is sufficient. The second coat, which of course should have been evenly spread and well rubbed in with the brush, should be allowed to dry somewhat longer than the priming coat. The third, or finishing coat should be one which will dry with a gloss, and for this purpose there should be no turpentine or thinner added to the paint at all. This method is one which is advocated by a large majority of authorities on the painting of wood, but is seldom carried out by painters, the tendency being to add excessive amounts of turpentine or benzine, unduly thinning the paint and making it possible to spread it in thin, even coats with less labor than would be required for the same thinness and evenness when paint of a proper consistency is used.

INTERIOR PAINTING.

For oil painting exposed to the weather (outside painting) it is very important that a durable paint be selected, because even the best painted surfaces in time are destroyed by outdoor exposures. Inside of a house, however, the conditions are radically different. The painted surface is exposed to neither the extreme heat of the summer sun nor to the action of rain and frost to anything like the extent that outdoor painting is. In fact, any paint will last for a very long time inside. The main point in selecting a paint for this work is to choose one which will cover well the article to be painted and which contains colors that are permanent. The actual protective coating may be assumed to last as long as there is any

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necessity for it. Very light tints or very brilliant colors are likely to fade, and white paints containing a large amount of oil tend to turn yellow in dark rooms. The pigment lithopone, which is not suitable for outside work, can be used with satisfaction for interior painting. Calcimines, the so-called cold-water paints,* in which no oil or expensive lead or zinc pigments are used, and which are, therefore, very much cheaper than oil paints, last very well on the inside; in fact, some of the oldest paintings in existence are fresco paintings made practically of calcimine.

For interior work the same directions apply as to outside painting, but it is not so important to have the final coating contain such a large amount of oil as to give a glossy finish. A dull finish is preferred by many people, and since this paint is not to be exposed to severe weather conditions, a larger amount of thinner may be used than for outside work. Also, paint for inside work should dry faster than one for the outside, and a somewhat larger amount of japan drier is generally used.

PAINTING OF METAL.

Tin or other metal roofing, also galvanized iron such as gutters and rain spouts, are very difficult to paint, as often the paint does not stick well. This is probably due to a very thin film of grease left on such material from the process of manufacture, and before attempting to paint a tin roof it is best to scrub it perfectly clean with soap and water or with cloths moistened with benzine, and then thoroughly dry before applying the paint. Galvanized iron may be treated in the same way, but it is much better to let this material stand for some time exposed to the weather before painting. The metal portions of machinery are generally cast iron or steel; wrought iron is rarely used, though it is more durable than steel. Cast iron is not so liable to rust as steel, and also the pieces are frequently thicker than the steel portions of a machine. There is perhaps nothing that actually needs paint for protection as much as the steel and iron portions of machinery. Before painting such material the greatest care should be taken to get the surface perfectly clean. Do not apply paint over rust, but clean thoroughly down to the bare metal with scrapers or wire brushes, and finally with dry scrubbing brushes. It is a mistake to spare labor in preparing a metal surface for paint. All oil and grease should be scrupulously removed, and the metal surface should be absolutely clean and dry before painting. The paint should be well brushed on, carefully filling all cracks.

Two or three coats of any good paint may be used. The paint which is generally supposed to protect iron from rusting better than any other is red lead. This is expensive, however, and rather hard to apply. The color also is some objection, although this can be overcome by mixing some dark pigment with it. The addition of a small amount of lampblack improves the color and the working quality of red-lead paint. A paint made of basic chromate of lead (so-called scarlet lead chromate, or American vermilion) is even better than red lead as a material for protecting iron. This also is very expensive, even more so than red lead, and while the protection is not so complete with the use of cheaper paints made of iron oxide pigments, on account of the fact that pieces of ma-

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* See page 155 for recipes for making calcimine.

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chinery are very likely to have the paint scratched and injured mechanically, it is perhaps best to use an iron oxide paint for most of such work, because of its cheapness. Any good oil paint will give valuable protection to iron if it is properly applied.

MIXING PAINTS.

Paints may be prepared either by mixing the dry pigments with oil and turpentine or benzine; or the paste pigments may be used. The latter are ground in a small amount of vehicle, generally linseed oil. The best pigments are exceedingly fine powders, and it is frequently a matter of considerable difficulty to mix such a powder uniformly with oil so as to have every particle in contact with the vehicle. On this account it is generally considered much easier to make up a paint from the paste pigments than from the dry, because the former have already been ground in a small amount of oil in a mill. When a can of paste pigment is opened all of it should be used immediately or it should be mixed with some oil and kept covered, since the paste is likely to harden and will then be ruined if exposed.

A very satisfactory hand paint mill can be bought for less than $10, and with such a mill the dry pigments may be mixed with oil and very satisfactory paints made directly. The claim is made, however, that many pigments require grinding under very heavy pressure to give the best results. Painters, therefore, generally prefer the use of paste pigments rather than the dry for most of their paint mixing. Besides the method of making up paints from the pigments, either dry or in paste form, with the necessary vehicle, the use of ready-mixed paints is very common, and for a small job they have an advantage, for no paint can be made properly without a large amount of grinding or stirring, and this is rather heavy work. The user of mixed paints, however, should have some method of estimating what the material he buys is really worth.

COMPOSITION OF PAINTS AND THEIR COST.

General Discussion.

It would probably not be denied by any one that a better paint can be made in a well-equipped factory than by any individual at home or in a small shop. Many ready-mixed paints are of the very best quality, but many are of poor quality, made of cheap materials, and at the same time are sold with extravagant claims and for high prices. The number of different formulæ found on the market is enormous, and no attempt will be made to give a complete or even a representative list of them. An effort will be made, however, to give a few typical formulæ of paints and the methods of calculating the cost of making paints whose composition is known. A very good rule to follow in purchasing mixed paints is to buy nothing which does not bear the name of the manufacturer. If the manufacturer's name does not appear on the label this is very good presumptive evidence that he is not particularly proud of his product. Many state laws require that the composition of paints should also be stated on the labels, and a large number of the best manufacturers do this whether their products are sold in a state requiring such labeling or not.

The most expensive paints are generally white paints or very light

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tints. The reason for this is that there are comparatively few white pigments which have covering power, *i. e.*, the property of hiding the surface of the material painted. Samples of dry white lead and of dry whiting look much alike. Both are white powders and a thin layer of each appears to be practically opaque. If, however, the two pigments are mixed in oil the whiting is quite transparent, while the white lead is opaque. All of the cheaper white pigments are more or less transparent in oil and are, therefore, deficient in covering power. White lead, zinc white, sublimed white lead, zinc lead, and lithopone are practically the only white pigments which have good covering power in oil. These pigments are all rather expensive, and as they are heavy it takes quite a large amount to make a paint.

Of the dark shades, there are a number of cheaper pigments which have very good covering power. It may be quite safely stated that for a white paint that really covers, some one or more of the white pigments just enumerated must be used. For a dark brown, however, a good covering can be obtained with an iron oxid pigment, which is very much cheaper. Therefore, for such paints there is no reason for using an expensive lead or zinc pigment.

Estimated Cost of White Paints.

A vehicle for outside paint of the best quality will generally consist of from 90 to 95 per cent of linseed oil and from 10 to 5 per cent of japan drier. A good japan drier has about the same specific gravity as linseed oil, and each may be considered to weigh about 7¾ pounds to the gallon. Of course, the prices of all paint materials vary, but at the present time linseed oil sells for approximately 90 cents a gallon, and a good grade of japan can be bought for $1.60. In making up paints, the drier should be mixed with the larger portion of the oil before adding the pigment. Using the prices and weights just given for linseed oil and japan drier, the liquid portion of a paint will cost about 95 cents a gallon, or 12¼ cents a pound. White lead, both dry and in the form of paste, costs approximately 7 cents a pound, zinc white approximately 8 cents a pound, and the other white pigments which cover well will not differ very much from these two in price. A gallon of white lead paint will weigh from 21 to 22 pounds. Fourteen pounds of dry white lead and 7¼ pounds of vehicle will make a gallon of paint and at the price quoted the cost would be about $1.87; 15 pounds of paste lead and 6¼ pounds of vehicle will make a gallon of paint, costing $1.82; 9½ pounds of white zinc and 5¾ pounds of the paint vehicle will make a gallon of zinc white paint costing about $1.46.

Of course, these prices are based on an assumed cost for the ingredients, and to make an exact estimate it would be necessary to know the exact prices of the different materials entering into the paint. Many painters insist that a paint composed entirely of white lead, linseed oil, and drier is the best. Others contend that a mixture of white lead and zinc white is the best, and still others say that a mixture of these pigments with the cheaper white pigments which have slight covering power makes a better paint than the expensive pigments alone. It is probably true that a mixture of lead and zinc is superior to either pigment by itself, and also that

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the addition of a small amount of so-called inert pigments (silica, whiting, barytes, china-clay, etc.) has no injurious effect on the paint and may even be benificial. The addition of a large amount, however, of such pigments will give a paint deficient in covering power, and the addition should have the effect of cheapening the product. There is no reason why any mixed paint should cost per gallon more than a paint made entirely of white lead, oil, and the necessary drier. By ascertaining the market price of white lead and linseed oil the buyer should be able to calculate the maximum price for a mixed paint.

Two samples of ready-mixed white paints which were bought at the same time, at practically the same price, will give an illustration of the difference in price of such materials. No. 3361, a white paint, weighed 12.4 pounds to the gallon. The total paint consisted of 63 per cent pigment and 37 per cent vehicle. The pigment contained 30 per cent zinc lead, 13 per cent white lead, 7 per cent whiting, and 50 per cent barium sulphate. Assuming the value of the zinc lead to be the same as that of the white lead, 43 per cent of the pigment was worth 7 cents a pound, and assuming the value of the whiting and barium sulphate to be 1 cent a pound, 57 per cent of the pigment was worth 1 cent a pound. The average price per pound of the pigment would, therefore, be 3.58 cents. A gallon of the paint weighs 12.4 pounds, of which 63 per cent, or 7.812 pounds, is pigment; this, at 3.58 cents a pound, would cost 28 cents. Thirty-seven per cent of vehicle in the gallon of paint will weigh 4.588 pounds. In this paint it consisted of linseed oil and a cheap benzine drier costing about 11 cents a pound, or 50 cents for the vehicle. The total cost of the materials in the paint, then, would be 78 cents per gallon.

Another paint, No. 3864, weighed 14.8 pounds per gallon and consisted of 58 per cent of pigment and 42 per cent of vehicle. The pigment was 55 per cent white lead and 45 per cent zinc white. If the price of these two pigments was 8 and 7 cents, respectively, the average price of the pigment in this paint would be 7.55 cents per pound. Since the gallon of paint weighed 14.8 pounds and contained 58 per cent of pigment, a gallon contained 8.584 pounds of pigment and 6.216 pounds of vehicle. The vehicle in this case was linseed oil and a good grade of turpentine drier. The pigment in this gallon of paint would be worth 65 cents (8.584 × 7.55) and the vehicle 76 cents (6.216 × 12.25). The total cost of the materials in this paint, therefore, would be $1.41.

These two paints, as before stated, were bought at the same time and at practically the same price. The prices paid would not be indicative of their value at the present day, since they were bought several years ago, when paint materials were considerably cheaper than they are now; but it is obvious that the margin of profit was very much greater on paint No. 3861 than on No. 3864.

Estimated Cost of Colored Paints.

Tinted paints, at least those of light tint, consist practically of white paint with the addition of a small amount of coloring matter. The coloring materials used in tinting are not uniform, and it is not possible, therefore, to give exact directions for producing a particular shade, since

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the amount of color used will depend upon the individual characteristics of the particular lot on hand. In general, gray tints are made from white paints by the addition of a black pigment, such as lampblack or bone black, and sometimes a small amount of red or blue is used also. The total amount of coloring matter employed varies, but rarely amounts to as much as 5 per cent. Buff may be made by the addition of mixtures of ocher and umber; brown, by the addition of mixtures of black, red, and sometimes yellow. Yellow and cream may be made by the addition of ocher or chrome yellow; frequently for this purpose golden ocher is used, which is ordinary ocher brightened by the addition of a small amount of chrome yellow. Blue tints may be made by the addition of small amounts of Prussian blue. This is a powerful tinting pigment, and it is seldom that more than 1 per cent is required. With the white paints which contain no lead, ultramarine blue may be used instead of Prussian blue; but ultramarine blue should not be used with lead paints.

Besides the tinted white paints, bright colors are sometimes desired, especially green, for blinds, and reds for the trimmings of houses or for machinery. These paints seldom contain any large amount of the expensive lead and zinc white pigments, but consist of comparatively small quantities of coloring matter and large amounts of the cheap white pigments. For black paints there is practically only one coloring substance, namely, carbon, which, however, occurs commercially in a number of forms. The color of so-called drop or ivory black is carbon, obtained from charred bone; lampblack is carbon in the form of soot. The latter, although very pure, does not make a satisfactory black alone, the heavier forms of carbon, such as bone black or even ground charcoal, producing a better black.

In the following table is given the composition of several tinted paints, and also of bright red, bright green, and black. The composition of individual lots of paint of any of these tints or colors might vary considerably from that given, and the table is only illustrative of the materials from which these different kinds of paints may be made. An estimate of the cost of the raw materials entering into the different formulæ is also included. The total cost per gallon does not make any allowance for labor or for containers, but is based solely upon the cost of the raw materials, assuming that white lead and sublimed white lead cost seven cents a pound, white zinc eight cents, and the other white pigments, barium sulphate, china-clay, whiting, and asbestine, one cent a pound. The price of the coloring material is given separately for each paint. These prices for the raw materials are a fair approximation of the retail price at the present time. In calculating the cost of the paints per gallon it is assumed that the vehicle in all cases is the same as that described on page 150 and it is valued at 12¼ cents a pound. An inspection of the table shows that there is comparatively little difference in the cost of the materials entering into these paints, with the exception of black paint, which is considerably cheaper than any of the others. The red paint is colored by an expensive color, para-red, costing 78 cents a pound; the rest of the pigment, however, is cheap, and it will be noticed that the paint weighs only 11.6 pounds per gallon, whereas some of the others weigh much more.

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Composition and cost of tinted and colored paints.

Data.	Tints.						Colored paints.		
	Gray.	Buff.	Yellow.	Drab.	Blue.	Brown	Red.	Green.	Black.
Percentage composition:									
Vehicle	43.4	43.0	45.0	41.0	43.0	49.0	57.0	34.0	65.0
White lead	......	......	13.0	......	......	12.0	......	......	......
Zinc white	21.0	21.0	25.0	21.0	22.0	24.0	2.0	......	......
Sublimed white lead	27.0	29.0	......	26.0	27.0	......	......	......	......
Barium sulphate	2.0	......	5.0	2.0	2.0	5.0	25.0	49.0	......
China-clay	5.0	......	......	4.0	4.0	......	......	......	......
Whiting	......	......	......	......	......	......	11.0	......	......
Ground slate	......	......	......	......	......	......	......	......	26.0
Asbestine	1.0	1.0	1.0	1.0	1.0	1.0	......	......	......
Color	.6	6.0	11.0	5.0	1.0	9.0	5.0	17.0	9.0
Total pigment	56.6	57.0	55.0	59.0	57.0	51.0	43.0	66.0	35.0
Nature of color	①	②	③	④	⑤	⑥	⑦	⑧	⑨
Weight in pounds per gallon:									
Total	14.7	14.8	14.1	15.2	14.8	13.4	11.6	16.4	10.0
Pigment	8.32	8.44	7.76	8.97	8.44	6.83	4.99	10.82	3.50
Vehicle	6.38	6.36	6.34	6.23	6.36	6.57	6.61	5.58	6.50
Cost per pound, dollars:									
Color	0.05	0.04	0.05	0.05	.030	0.05	0.78	0.19	0.10
Total pigment	.065	.069	.066	.065	0.07	.066	.103	.056	.033
Cost per gallon, dollars:									
Pigment	.541	.582	.512	.583	.591	.451	.514	.606	.116
Vehicle	.782	.779	.777	.763	.779	.805	.810	.684	.796
Total	1.32	1.36	1.29	1.35	1.37	1.26	1.32	1.29	.91

1. **Bone black; tuscan red; ultramarine blue.**
2. **Umber and ocher.**
3. **Golden ocher.**
4. **Ocher and bone black.**
5. **Prussian blue.**
6. **Bone black; venetian red; chrome yellow.**
7. **Para-red.**
8. **Five-sixths chrome yellow, one-sixth Prussian blue.**
9. **Carbon.**

For dark shades of brown or red there is probably nothing which is as cheap as the oxide of iron pigments. These vary very much in shade, giving both browns and dull reds. A pigment that gives a very satisfactory reddish brown and contains about 40 per cent of iron oxide makes a satisfactory paint containing approximately 56 per cent pigment and 44 per cent vehicle, the vehicle being very much the same as that used in a first-class white paint. Such a paint will weigh about 13.5 pounds to the gallon, which, therefore, will contain 7.56 pounds of pigment and 5.94 pounds of vehicle. This pigment is cheap, generally costing not more than 1 or 1½ cents per pound. The pigment in a gallon of this paint, therefore, would cost approximately 10 cents, and the 5.94 pounds of vehicle about 73 cents, giving a cost of 83 cents for the gallon of paint.

An inspection of these figures shows that the expensive part of this paint is the vehicle and not the pigment. A paint of this character is a very good material to apply either to wood or iron. There are more expensive paints, however, frequently used on iron to protect it from rusting, the most popular being red lead and linseed oil. This material undoubtedly affords very good protection, but it is also expensive. A red-lead paint can not be made and kept as most other paints can. The red lead itself causes the oil to dry, and no additional drier is necessary. In fact, red lead should not be mixed until just before it is used. A paint made of 70 per cent of red lead and 30 per cent of linseed oil will weigh about 19.8 pounds to the gallon. A gallon of paint, therefore, will contain 13.86 pounds of red lead, which costs about 8 cents a pound, making the

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cost of the pigment in a gallon of this paint approximately $1.11. The 30 per cent of linseed oil will weigh 5.94 pounds, and a gallon of linseed oil 7.75 pounds, costing about 90 cents at the present time, or 11.5 cents a pound. The oil in the paint will cost then about 68 cents, and a gallon of red-lead paint would cost $1.79, as compared with 83 cents for a gallon of oxide of iron paint. These two paints will cover about the same area of clean iron, and while somewhat better service might be expected from the red-lead paint, it is more than twice as expensive as the iron-oxide products.

WHITEWASH.

Whitewash is the cheapest of all paints, and for certain purposes it is the best. Lime, which is the basis of whitewash, makes a very sanitary coating, and is probably to be preferred for cellars and the interior of stables and other outbuildings. The following directions for making whitewash are taken from "White Paints and Painting Materials," by W. G. Scott:

Ordinary whitewash. This is made by slaking about 10 pounds of quick-lime with 2 gallons of water.

The lime is placed in a pail and the water poured over it, after which the pail is covered with an old piece of carpet or cloth and allowed to stand for about an hour. With an insufficient amount of water, the lime is "scorched" and not all converted into hydrate; on the other hand, too much water retards the slaking by lowering the heat.

"Scorched" lime is generally lumpy and transparent, hence the use of the proper amount of water for slaking and an after addition of water to bring it to a brush consistency.

Factory whitewash. (*Interiors*): For walls, ceilings, posts, etc.

(1) Sixty-two pounds (1 bushel) quicklime, slake with 15 gallons water. Keep barrel covered until steam ceases to rise. Stir occasionally to prevent scorching.

(2) Two and one-half pounds rye flour, beat up in ½ gallon of cold water, then add 2 gallons of boiling water.

(3) Two and one-half pounds common rock salt, dissolve in 2½ gallons of hot water.

Mix (2) and (3), then pour into (1) and stir until all is well mixed.

This is the whitewash used in the large implement factories and recommended by the insurance companies. The above formula gives a product of perfect brush consistency.

Weatherproof whitewash. (*Exteriors*): For buildings, fences, etc.

(1) Sixty-two pounds (1 bushel) quicklime, slake with 12 gallons of hot water.

(2) Two pounds common table salt, 1 pound sulphate of zinc, dissolved in 2 gallons of boiling water.

(3) Two gallons skimmed milk.

Pour (2) into (1), then add the milk (3) and mix thoroughly.

Lighthouse whitewash. (1) Sixty-two pounds (1 bushel) quicklime, slake with 12 gallons of hot water.

(2) Twelve pounds rock salt, dissolve in 6 gallons of boiling water.

(3) Six pounds Portland cement.

Pour (2) into (1) and then add (3).

NOTE.—Alum added to a lime whitewash prevents it rubbing off. An ounce to the gallon is sufficient.

Flour paste answers the same purpose, but needs zinc sulphate as a preservative.

Molasses renders the lime more soluble and causes it to penetrate the wood or plaster surface; a pint of molasses to 5 gallons of whitewash is sufficient.

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Silicate of soda solution (about 35° Baumé) in the proportion of 1 to 10 of whitewash produces a fireproof cement.

A pound of cheap bar soap dissolved in a gallon of boiling water and added to about 5 gallons of thick whitewash will give it a gloss like oil paint.

An old receipt for whitewash, issued by the Lighthouse Board of the Treasury Department, said to be very good for outdoor exposure is as follows:

Slake half a bushel of unslaked lime with boiling water, keeping it covered during the process. Strain it and add a peck of salt, dissolved in warm water; three pounds of ground rice put in boiling water and boiled to a thin paste; half a pound of powdered Spanish whiting and a pound of clear glue, dissolved in warm water; mix these well together and let the mixture stand for several days. Keep the wash thus prepared in a kettle or portable furnace; and when used, put it on as hot as possible, with painters' or whitewash brushes.

The washes which contain milk, flour, or glue are not to be advised for use in damp, interior places, owing to danger of decomposition of the organic matter. For such locations it is better to use one of the formulæ containing none of these ingredients. Whitewash is applied with a broad whitewash brush and is spread lightly over the surface, no attempt being made to brush it in as is the case with an oil paint.

CALCIMINE.

Cold water paints or calcimine have as their basis whiting or carbonate of lime instead of caustic lime, as in whitewash. This material itself does not adhere, and it is necessary to use a binder of some kind, generally glue or casein. Scott also gives the following directions for making calcimine:

Ordinary white stock. (*Calcimine.*) (1) Sixteen pounds dry Paris white (whiting) mixed until free of lumps, with 1 gallon boiling water.

(2) One-half pound white sizing glue; soak 4 hours in one-eighth gallon cold water. Dissolve on a water-bath (gluepot) and pour into (1).

The above recipe makes about 2 gallons of stock, weighing 12¾ pounds per gallon. It is of proper brush consistency and may be used at once, but is better after standing half an hour. Any tint may be given the white stock by stirring the desired dry color in a little water and adding sufficient liquid color to the base.

The following data in regard to the covering capacity and time of applying was obtained as an average of several years' work from shop records:

One gallon covers on plaster = 270 square feet.
One gallon covers on brick = 180 square feet.
One gallon covers on wood = 225 square feet.

A man in 1 hour using a 5-inch brush, will coat the following amount of surface:

Rough walls = 22 square yards (198 sq. ft.).
Smooth walls = 38 square yards (342 sq. ft.).
Brick walls = 20 square yards (180 sq. ft.).
Flat surface (bench or floor) = 40 square yards.
Ceiling (with stepladder) = 25 square yards.

Damp-proof calcimine. (*White stock.*) For plastered walls. (1) Sixteen pounds Paris white or extra gilder's whiting, 1 gallon boiling water.

(2) One-half pound white sizing glue, soak 4 hours in one-half gallon cold water, then dissolve on a water bath.

(3) One-fourth pound phosphate of soda, dissolve in one-eighth gallon boiling water.

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Mix (3) with (1), then add (2).

If a thick white stock is wanted, use half a gallon of water with the 16 pounds of Paris white instead of one gallon. For tinting, use colors that are not affected by lime, namely, yellow ochers, sienna, umbers, Venetain red, para-red, maroon oxid, ultramarine blue, ultramarine green, chromium oxid, bone black, etc.

If lampblack is used for tinting, it must be stirred up in hot water containing a little soap or in cold water containing a little borax, the alkali overcoming the greasy nature of the lampblack.

PRECAUTIONS TO BE OBSERVED IN PAINTING.

Do not use any paints containing compounds of lead about stables or outbuildings where the fumes from decaying organic matter occur, since these gases are likely to darken the lead paints. Do not use with lead compounds any pigments which may liberate compounds of sulphur. For example, ultramarine blue which contains sulphur in a form in which it may be set free is a beautiful and very permanent blue and may be used with zinc white, but should not be used with white lead or any other lead pigments. Prussian blue, on the contrary, does not contain sulphur and may be used with lead pigments.

Remember that turpentine and benzine are very imflammable, and especial precautions should be taken not to bring paint containing these substances near any light or open fire.

Many pigments are poisonous, and the workman should be particularly careful to remove all paint stains from the skin, and not under any circumstances allow any of it to get into his mouth. A man should not eat in the same clothes in which he has been painting, and before eating should not only change his clothes but wash all paint stains from his skin. it is not advisable to use turpentine or benzine in removing paint stains from the hands, but by oiling thoroughly with linseed oil, or, in fact, with any fatty oil, and then thoroughly washing with soap, the paint may be removed, provided it has not been allowed to dry too thoroughly on the hands.

COMBATING ORCHARD AND GARDEN ENEMIES.

From Bulletin No. 102, Missouri Experiment Station, by W. H. Chandler.

Article 1.—PURPOSE OF SPRAYING.

Spraying is done for the purpose of preventing injury to the fruit, foliage and wood of trees and other plants caused by diseases and insects.

Diseases of plants may be caused by the growth in the tissues of bacteria or fungi. Bacteria usually grow beneath the surface and can not be combated by means of spraying. Some fungi grow upon the surface, sending feeding organs down into the tissue from which they secure nourishment from the plant sap. These fungi are reproduced by means of spores which are carried in the air until they settle upon leaf, fruit or wood, where they germinate and grow, becoming the injurious fungous tissue. If the leaves or fruit are covered with a substance which is poisonous to the fungus the spores will be killed at the time they germinate. Substances that thus prevent the growth of germinating spores are called fungicides. As a rule these fungicides must be applied in summer when the fruit or foliage is likely to be

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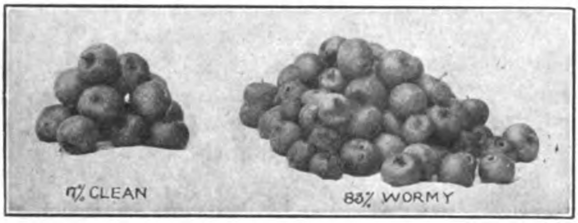
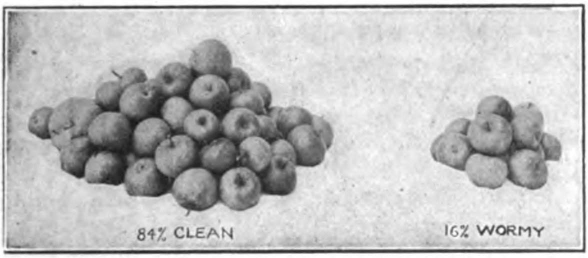
infected. However, in the case of a very few diseases like peach leaf curl, spraying in early spring before growth starts is successful.

The two most important fungicides (sprays to prevent fungous diseases) for summer spraying are Bordeaux mixture and lime-sulphur. For directions for making Bordeaux mixture see article 30, and for lime-sulphur see article 31. For other fungicides see articles 32 to 36 inclusive.



Apples not sprayed.



Apples sprayed.

We have two classes of insecticides (sprays to kill insects). For insects that eat from the surface of the plant a poison on the leaves or fruit will kill the insect. Usually the spray used in this case is some compound containing arsenic. The most important insecticide is arsenate of lead. (See article 37.)

There are also insecticides used to kill insects that do not eat from the surface, but penetrate the surface with their beaks and suck the juices from beneath. It is plain that such an insect could not eat any poison placed upon the leaves, but must be destroyed by a spray that kills by coming in contact with its body, so insecticides for sucking insects are sometimes spoken of as contact sprays. The most important of these are probably lime-sulphur (see article 40), kerosene emulsion (see article 41) and the miscible oils (see article 42).

Article 2.—Cost of Spraying.

It is impossible to give any accurate estimate of the cost of spraying unless the size of the trees is known. It is usually necessary to spray four times a year. Where bitter rot is present, two or three more sprayings will be necessary. With trees varying from twelve to eighteen years of age growing in reasonably good soil, the cost of material will vary from nine to thirteen cents a tree for four sprayings. The cost of labor is usually ten to fifteen cents per tree. The total cost then of the four sprayings for labor and material would range from eighteen to twenty-eight cents a tree. The labor cost will be greater with the small spraying outfit than with the large one. For the larger spraying outfit the labor cost will vary from two to six cents for a single spraying, while with a good hand pump and good tank the labor cost will be from four to twelve cents a tree for one application. With the barrel pump the cost will be still higher.

Article 3.—PROFITS FROM SPRAYING.

It is difficult to give a close estimate of the profits to be derived from spraying, since with some orchards the diseases and insects have not become as serious as with others. In no case, however, that the writer has ever observed where spraying has been properly done, has the orchard failed to give a larger net income. In an orchard sprayed by the Nebraska Experiment Station, the total cost of spraying per tree was twenty-four cents; the income per tree from the sprayed trees was $2.35, from unsprayed trees, eighty-one cents, leaving an income of $1.50 more from the sprayed than from the unsprayed trees, or a net income above the cost of spraying of $1.30 more on the sprayed than on the unsprayed trees. In other cases the difference between the profit on sprayed and unsprayed trees has been very much greater than this. The difference, of course, will depend on the prevalence of diseases and insects.

In an orchard near Columbia, 100 trees were sprayed by the Missouri Experiment Station, and the owner said in a public meeting that he picked more marketable apples from this 100 trees than from the remaining 3600 that were not sprayed. The fact is that after the diseases and insects have become serious, as they were in the case just mentioned, it is practically impossible to make an orchard business pay without spraying. In the section around Koshkonong, Oregon county, in the past three years, very few orchardists have been able to ship peaches where spraying was not done. Thus the business of fruit growing in many cases absolutely depends upon spraying.

Article 4.—CONDITIONS AFFECTING PROFITS FROM SPRAYING.

In determining the profits from spraying, the cost of the equipment must also be considered (see spraying equipment, article 51). In an orchard which bears regularly the seriousness of the first cost of spraying equipment will not be so great, but if the orchard is in a section where crop failures are common, the purchase of an expensive equipment might prove an item of heavy expense. The grower must decide for himself whether it will pay him in a section where he has a considerable risk, to purchase an expensive but efficient spraying outfit or to purchase a cheaper somewhat less efficient spraying outfit. With the latter, labor cost will be greater, but the investment is less. In many cases it might pay the orchardist to lay in a supply of spraying materials only large enough to do him until all danger of frost is past. Of course this would not be advisable in sections where it would take a considerable length of time to secure spraying materials. Certainly a large enough supply should be purchased before the first spraying begins to give at least one application, if not two, after the bloom falls.

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Some orchardists, usually influenced by the agents of spraying materials, give a spraying in late winter while the trees are still entirely dormant, even though they do not have in the orchard San José scale or any other insect or disease that is best sprayed for at that time. The theory is that this dormant spraying is a sort of a clean-up spray to kill spores or insects that are lodged on the trees. However, such a spraying can not possibly replace any of the summer sprayings after the leaves have come out, and while it may be profitable, it is certainly much less profitable than the summer sprayings. Until the orchard is in a good paying condition and well kept in every other way, such as pruning, cultivation, etc., as well as summer spraying, this winter spraying where San José scale is not present can hardly be advised.

SPRAYING APPLES.

Article 5.—FUNGOUS DISEASES OF THE APPLE THAT CAN BE CONTROLLED BY SPRAYING.

APPLE SCAB (*Venturai inaequalis*). This disease causes the distorted, scabby appearance of the fruit and leaves of the apple as shown in the figure. It appears in early spring as soon as the leaves are out and may injure the young foliage, the bloom stems, and also the young fruit as soon as it is formed. It is favored by cool, wet weather.

FIG. 1.—Apple scab on the fruit.

FIG. 2.—Apple scab on the leaves.

Scab is rather easily controlled either by the use of Bordeaux mixture or lime-sulphur. The first spraying should be given just before the bloom opens, and in this case it is usually better to use Bordeaux mixture. The second spraying is given as soon as the blooms are off, and the third, two or three weeks after the blooms fall. In the second and third sprayings if Bordeaux mixture is used, it should not be at a strength greater than 2:3:50. (See articles 30 and 31 on making and use of Bordeaux mixture and lime-sulphur.) Lime-sulphur may be substituted for Bordeaux mixture if apple blotch is not present.

RUST (*Gymnosporangium macropas* Lk.). This disease causes orange-

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colored spots on the leaves, and yellow spots on the fruit of the apple. When serious it may cause a considerable falling of the leaves. One stage of the life history of this fungus is passed in the characteristic "cedar apple" or galls on cedars, and it is from these galls that the spores infect the apples in the spring.

The most important remedy for this disease is to keep all nearby cedar trees cut out. The second spraying for scab, just after the blooms fall, is the most important spraying for rust.

Black Rot (*Sphaeropsis malorum* Pk.). This disease causes in some sections the rotting of fruit in storage or just before it is picked. In the Missouri section it will be seen largely as reddish-brown spots on the leaves and black spots on the twigs. It also attacks the trunks of the trees, causing cankers. In the canker form this disease is very prevalent in some of the best fruit sections of the state. The disease on the leaves is controlled by the same sprayings with Bordeaux mixture that control apple scab. The cankered areas on the limbs should be cut out and the wounds painted.

Fig. 3.—Canker on apple limb.

Fig. 4.—Cutting out canker on limb with drawing knife.

Fig. 5.—Apple blotch on fruit.

Apple Blotch (*Phyllosticta solitaria* E. & E.). This disease appears on the fruit as star-shaped spots like those shown in the figure. It also causes very small round spots on the leaves, and cankers on the twigs. The fruit is apparently infected from the spores disseminated from these twig cankers in spring. This infection takes place about three weeks to a month after the blooms fall, and it is at this time that the disease must be sprayed for. Lime-sulphur does not control bloch so Bordeaux mixture must be used where apple blotch is present. (See article 30.)

Fly Speck Fungus and Sooty Blotch (*Leptothyrium pomi* Mont & Fr. Sacc.). These diseases appear as little black dots on the fruit and as little irregular spots like little piles of soot.

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They are controlled by spraying with Bordeaux mixture when the fruit is a little more than one-fourth grown. They are generally controlled by the sprayings mentioned for other diseases.

BITTER ROT (*Glomerella rufomaculans* Berk, Spaulding and Von Schrenk). In the extreme southern part of the state this disease may at times be very destructive. It is not so serious in North Missouri, since the disease is favored by hot, wet weather. It usually appears during the months of July and August, although it has been known to appear in June. It shows first as small sunken decaying spots on the fruit. These spots may enlarge and run together until the whole apple may be rotted. Some varieties like Huntsman and Willow Twig are much more susceptible than others. The same fungus also causes cankers on the limbs.

So far as we know, this disease can be controlled only by the use of Bordeaux mixture. The first spraying should usually be about six weeks after the bloom falls and if the disease is serious, three other sprayings at intervals of about two to three weeks should be given. Sometimes two or three sprayings will control it. The Bordeaux mixture should generally be used at a strength of 5:5:50. (See article 30.) The cankers on the limbs and twigs should be cut out and the wounds painted.

FIG. 6.—Apple blotch canker on twig.

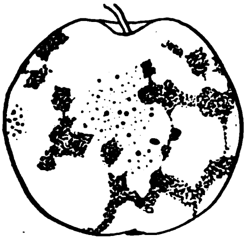

FIG. 7.—Fly speck and sooty black blotch on apple.

FIG. 8.—Early stage of bitter rot on apple.

Article 6.—BITING INSECTS OF THE APPLE THAT MAY BE CONTROLLED BY SUMMER SPRAYING.

CODLING MOTH (*Carpocapsa pomonella* Linn.). This is the insect that usually causes the wormy apple. Figure 9 shows the adult moth which is usually about five-eighths of an inch across its expanded wings. These adults appear in spring about the time the apple trees are in bloom, and they remain for several weeks. They deposit their eggs on the smooth surfaces of the leaves near the fruit and at times on the stems of the young fruit. The eggs hatch in a few days and the larvæ of this first brood usually crawl to the blossom end of the apple and eat their way in. When the larvæ (worm) is full grown it eats its way out of the apple and

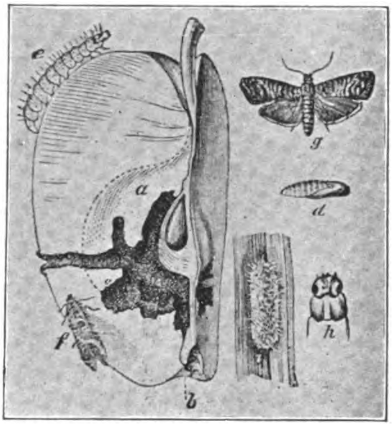

FIG. 9.—Various stages of codling moth on the apple. (*a*) Injury done to apple, (*c*) Worm. (*g*) Adult which deposits the egg.

FIG. 10.—Curculio sting on the apple.

goes into the pupa stage under any kind of rubbish or rough bark. The adult emerges, giving us the second brood, beginning about six or seven weeks after the bloom falls.

The best spray for codling moth is arsenate of lead (see article 37). Arsenate of lead paste should be used at a strength of about two and one-half pounds to fifty gallons of water. Since the insect eats its way into the blossom end, it is very important that the calyx (blossom end) be filled with the poison. The parts of the calyx close over the calyx tube about seven days after the bloom falls (see fig. 14) so it is very important that the calyx tube be filled with the spray before this time since it would not penetrate afterwards. The thoroughness of this spraying will largely determine the effectiveness of our season's work. In some states a single very thorough spraying is all that is used on the apple orchard in one season, though it has been found in this section that two or three sprayings will better control the colding moth. The first one is given as mentioned above within seven days after the bloom falls; the second in about two or three weeks and the third usually early in July, or about six or seven weeks after the bloom falls.

CURCULIO (*Conotrachelus nenuphar* Herbst.). This is probably the worst orchard pest in Missouri. While it is most destructive to plums, peaches and pears, it is also a very serious pest of the apple. The adult curculio (see figure) lives through the winter under any available rubbish, coming out with warm weather in the spring. It at first makes holes in the fruit for feeding purposes, and later makes holes for the purpose of depositing eggs. In this case it always makes a moon-shaped cut near the hole. If the egg hatches and the apple falls to the ground, the worm crawls into the ground and goes into the pupa stage, the second crop coming out in late August. This adult stings the fruit in the fall for feeding purposes and then hibernates on the approach of winter.

The ravages of the curculio may in some cases be checked by thoroughly cultivating in late July and early August since they are in the ground in the pupa stage at this time, and are easily injured either by sunlight or by stirring the soil. The only certain method of controlling the curculio, however, is by means of spraying. The first spraying for codling moth, just after the bloom falls will probably get some curculio, but the larger percentage of them will be killed by a spray ten days to two or three week after the bloom falls. In the case of curculio, an unsprayed orchard near ours will reduce the effect of our spraying more than in the case of codling moth for the reason that it is the adult curculio which can fly from orchard to orchard that does the stinging rather than the worm which can attack only one fruit as in the case of codling moth.

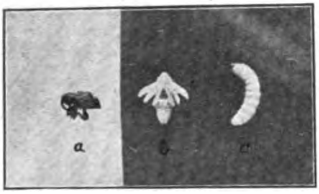

FIG. 11.—(*a*) Adult curculio that makes the sting on the apple; (*b*) pupa; (*c*) larva.

FIG. 12.—Time of first spraying for apple scab—just before the blooms are open.

OTHER EATING INSECTS. There are a number of eating insects of the apple, such as cankerworm, bagworm, lesser apple leaf folder, leaf crumpler, apple tree tent caterpillar, etc., that will do harm, especially in an unsprayed orchard. These insects, however, can usually be kept in check by means of sprayings given for codling moth and curculio, and by adding arsenate of lead to the spray for scab before the bloom opens.

Article 7.—COMBINED SPRAYING FOR APPLE DISEASES AND INSECTS CONTROLLED BY EITHER BORDEAUX MIXTURE OR LIME-SULPHUR COMBINED WITH ARSENATE OF LEAD.

First spraying. After the cluster buds have opened (see figure) but before the blossoms have entirely opened. Bordeaux mixture 4:4:50, and arsenate of lead two pounds. This destroys apple scab, black rot, and early leaf-eating insects like cankerworm. Sometimes when an orchard has been kept well in hand, the arsenate of lead may be omitted.

Second spraying. Just after the blooms have fallen (see figure), spray either with Bordeaux mixture 2:3:50, or lime-sulphur, specific gravity 1.009, and arsenate of lead two and one-half pounds to fifty gallons. This is the important spray for codling moth. It is also beneficial in controlling apple rust, curculio and other less important diseases and insects.

Third spraying. About three weeks after the blooms fall, spray with Bordeaux mixture 2:3:50, or lime-sulphur, specific gravity 1.009, and arsenate of lead, two and one-half pounds to fifty gallons. This destroys curculio, codling moth, apple scab, apple blotch, black rot, etc.

Fourth spraying. This should be done about six weeks after the bloom falls. Use Bordeaux mixture 4:4:50, with arsenate of lead, two and one-half pounds to fifty gallons. The fourth spraying destroys the second brood of codling moth, fly speck, sooty blotch, and bitter rot if it is present.

FIG. 13.—Time of important spraying for codling moth—just after the bloom falls.

FIG. 14.—Too late for the important spraying for codling moth. The calyx has closed over the blossom end.

FIG. 15.—Young fruit ready for the third spraying.

If curculio is serious it may be well to give the third spraying only two weeks after the bloom falls, and the fourth spraying four weeks after the bloom falls. Then if a spraying for the second brood of codling moth or bitter rot is necessary, the fifth spraying instead of the fourth would come six weeks after the bloom falls.

If the orchard is in a section where bitter rot is serious, another spraying should be given about eight or nine weeks after the bloom falls, and another one ten or twelve weeks after the bloom falls. If this last spraying is given ten weeks after the bloom falls, another should be given twelve weeks after the bloom falls, in all cases using Bordeaux mixture 5:5:50. (See directions for making and using Bordeaux mixture and lime-sulphur, articles 30 and 31.)

Article 8.—SPRAYING FOR SUCKING INSECTS OF THE APPLE.

WOOLY APHIS (*Schizoneura lanigera* Hausm.). This insect is well known by the bluish-white downy or cottony covering it excretes. A group of these insects show as a cottony mass, generally around the base of the tree. It causes the galls on the roots of the tree like those shown in the figure. It may seriously injure the growth of the tree in a section where it is abundant. In sections north of the Missiouri river all adult insects are usually killed through the winter, so that the insects the summer following must all come from eggs. From the Ozark region south, however, in a large percentage of the winters some of the adult insects live through the winter and begin at once with warm weather to bring forth young very rapidly, so that they become serious much more quickly in the spring than in sections farther north. The insects are found both on the tops of the tree and beneath the soil on the roots.

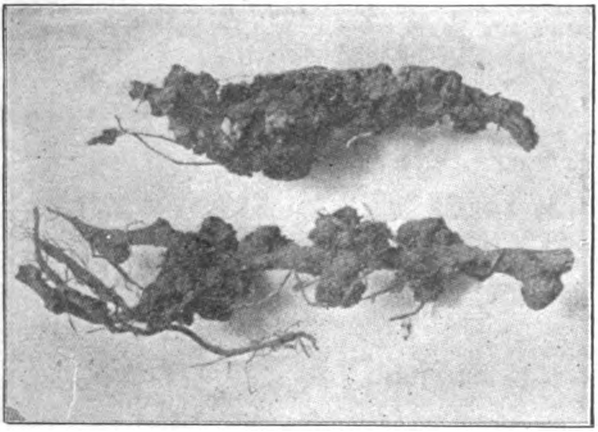

FIG. 16.—Wooly aphis injury on small apple roots.

In sections where the insects live through the winter, those on the portion of the tree aboveground may be killed by spraying with kerosene emulsion, or Black Leaf dip as directed by manufacturers, or home-made tobacco tea (see articles 41 and 43), just before growth starts. While the insects do not do serious injury to the top of the tree, they are constantly going down from the top to the roots. To kill those on the roots, no absolutely certain method has been found, though probably the best method is to dig away the soil for a depth of a few inches, uncovering the roots that are the most infested in a radius of about one and one-half feet from the tree, and spray with a ten-per-cent kersosene emulsion or Black Leaf dip, or tobacco tea, and pull the earth back around the tree. Pulling the earth away in this manner and sprinkling liberally with

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tobacco dust is claimed to be good, though where this method has been tried it has not proved as beneficial as spraying. If young trees are kept in a thrfty condition by cultivation, fertilizing, etc., injury from wooly aphis will not be so great as with neglected trees. Keeping the soil around the base of the trees well cultivated, so that there will be no cracks through which the insects can go to the roots, seems to be of some value in controlling them.

SAN JOSÉ SCALE (*Aspidiotus perniciosus* Const.). This insect inserts its beak into the bark of the tree or the skin of the fruit or leaf and excretes a scale, covering its body. It multiplies rapidly and may completely cover the bark of limbs and trunks of trees. When the limbs become incrusted with them, especially young trees, the tree is likely to die.

San José scale can be readily controlled by spraying with boiled lime-sulphur (see article 31) at a strength of about 1.03 specific gravity, or by the use of the miscible oils. Use the miscible oils (see article 42) at the strengths recommended by the companies selling the oil. Spraying should usually be done in early November or early March.

OYSTER SHELL BARK LOUSE, or OYSTER SHELL SCALE (*Mytilaspis pomorum* Bouche.). The scales of this insect are larger and more conspicuous than San José scale. They are less harmful to the tree than San José scale, and are not generally numerous enough to be serious. The scale in winter covers eggs and mature insects, as in the case of San José scale. For this reason the winter dormant spraying is not so effective as with San José scale. It is controlled best by spraying with about seven-per-cent kerosene emulsion (see article 41) sometime shortly after the bloom falls.

Article 9.—INSECTS AND OTHER DISEASES OF THE APPLE CONTROLLED BY MEANS OTHER THAN SPRAYING.

BORERS. We have both the round-headed apple tree borer (*Saperda candida* Fab.), in which case the worm or larva is in the wood during parts of three seasons; and the flat-headed apple tree borer (*Chrysobothris femorata* Fab.), which lives in the trunk of the tree only one season. The injury done by both is in cutting into the bark and sap wood of the tree, sometimes, especially in the case of young trees, almost entirely girdling them, thus ruining the trees.

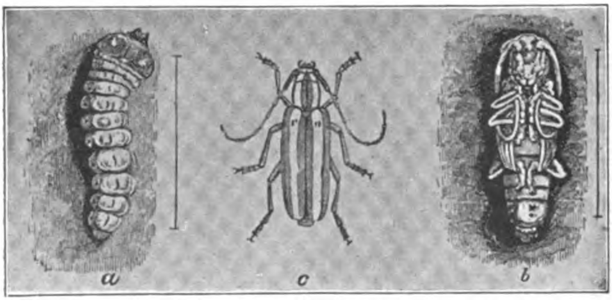

FIG. 17.—Round-headed apple tree borer.

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The methods of fighting both round- and flat-headed borers are much the same. The most important means of combating the borer is by going through the orchard in late August to early October and digging away the soil around the base of the tree and finding the larva burrows and pushing a sharpened wire in them until the larva is reached and killed. If the worm does not make paths straight enough so that the wire can be pushed in, it will be necessary to cut part way in with a knife.

FIG. 18.—Flat-headed apple tree borer.

Two or three methods are available for making the control of borers more easy. In case of older trees, probably the most important method is by mounding, that is, heaping up a little mound of earth around the base of the tree. This forces the insect to deposit its egg higher on the tree so that the worm will be located higher. It is much easier to level this mound of earth down around the tree to find the borer than to have to dig away the soil when it is left level. However, mounding may not be practicable in very stony land. In the case of younger trees, the best method is to wrap them with a wood veneer wrapper as shown in fig. 37, and mound a very small amount of earth around these wrappers. This makes it very difficult for the parent of the borer to get its eggs deposited in the trunk of the tree. In sections where the borers are rather numerous, while this practice of wrapping should be followed, it should not be wholly depended upon, but the examining for the borers should also be done. If the wooden wrappers are used on apple trees in southern Missouri, it may be necessary to spray inside of them with kerosene emulsion or lime-sulphur for the wooly aphis that are apt to accumulate there.

FRUIT TREE BARK BEETLE (*Scolytus rugulosus* Ratz). See under insects of the peach. (Article 15.)

BLIGHT. This disease is not serious with many varieties of apples, especially if badly infected pear trees are not closely adjacent. With some varieties, such as Yellow Transparent and Lowell, it is, however, very serious, and with infected pear trees near it may be very injurious to Jonathan apple trees.

The best remedy is not to have infected pear trees. It can not be controlled by spraying. Pruning is the only remedy aside from keeping away the pear trees. (See under Pears, article 12.)

SPRAYING PEARS.

Article 10.—INSECTS AND DISEASES OF THE PEAR CONTROLLED BY SPRAYING.

SCAB (*Venituria pyrina* Aderh). Very similar to the scab in the apple.

Spray with Bordeaux mixture just before the blooms open, just after the blooms fall, and again in about two weeks.

LEAF BLIGHT (*Entomosporium maculatum* Lev.). This disease causes small red spots on the upper side of the leaves in early spring. The young leaves shrivel up and fall off, and the old leaves fall, retaining their shape. Young twigs may also be killed. Bright-colored spots appear on the fruit, which gradually turn dark and spread out, thus causing the surface to become rough and sometimes to crack.

Spray with Bordeaux mixture about one week after the bloom falls, and again in about two weeks. Nursery stock should be sprayed five or six times at intervals of two weeks, beginning as soon as the leaves come out.

LEAF SPOT (*Septoria pyricola* Desm.). This disease appears on the leaves as angular spots with white centers, and is combated by the same treatment as that for leaf blight.

INSECTS COMMON TO THE PEAR AND APPLE. The same insects affect the pear that have been discussed under the apple, especially codling moth, and for discussions of these see insects of the apple (article 6).

PEAR SLUG (*Eriocampoides limacina*). This is a snaillike insect that eats on the leaves in late May and early June. It eats out the tissues between the mid-ribs and the other veining of the leaves, skeletonizing them. This slug is about one-half an inch long and of an olive-brown or dull green color. The same insect also infests the cherry and the plum.

Arsenate of lead is the most desirable spray, though the insect may be killed at times by merely dusting slaked lime heavily on the trees.

Article 11.—COMBINED SPRAYING FOR DISEASES AND INSECTS OF THE PEAR.

First spraying. Just before the bloom opens, as with apples, using Bordeaux mixture 4:4:50, and arsenate of lead, two pounds.

Second spraying. Just after the bloom falls, using Bordeaux mixture 2:3:50, and arsenate of lead, two pounds.

Third spraying. About two weeks after the bloom falls, using the same mixture as for the second spraying.

Fourth spraying. About four weeks after the bloom falls, using the same mixture as for the second and third sprayings.

Later sprayings may be necessary for the slugs when they appear, and the fourth spraying may sometimes be omitted. (See directions for making Bordeaux mixture, article 30).

Article 12.—PEAR BLIGHT.

This disease is the most serious one which affects pears in this section. In fact it probably renders commercial pear growing inadvisable. It is the disease which causes the leaves and twigs to turn black in summer. Its first appearance is when the flower clusters shrivel and die, a few weeks after blooming. Later, leaves, twigs and even large branches may turn black as they die. Young trees may thrive until they are old enough to bloom, when through the agency of insects that visit the flowers the infection is carried from blighted trees to the flowers of other trees, and they are thus liable to be ruined by blight.

There is no certain remedy for blight. Spraying has not proved to

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be of any value. Pruning is the only remedy, and it is a very laborious process. All blighted wood should be cut out and burned, and the trees should be examined carefully for cankers (sunken dead portions on the bark) toward spring, since it is from these cankers that infection spreads. These cankers should be thoroughly cut out and care taken to cut away all diseased portions. The wounds should be carefully painted. It is sometimes beneficial to seed the pear orchard to grass, since by checking the growth of the wood it becomes firmer and more resistant to pear blight. No fruiting spurs should be left on the trunk or main branches, because through these blight may penetrate and destroy an entire branch or even the whole tree.

SPRAYING PEACHES.

Spraying peaches is a more delicate operation than spraying apples, for the reason that peach foliage is very susceptible to injury from most sprays. Thus Bordeaux mixture should never be used on the peach except when the foliage is off, say about March for peach leaf curl. Neither should Paris green ever be used. However, the self-boiled lime-sulphur properly made (see article 32) is not injurious to the foliage, and arsenate of lead can be applied satisfactorily if it is not used more than twice during one season, after blooming but before the foliage is too old. Arsenate of lead should always be accompanied with lime to reduce the injury and make it wash off the foliage rapidly. It should be understood that we never spray peaches when they are in leaf for any benefit to the foliage; it is for the fruit only, so the more rapidly the sprays are washed off the foliage the better it will be. The hairy covering of the peach retains the spray on the surface well, and thus a spray may be used for peaches that is too coarse and too easily washed off for apples or pears.

Article 13.—DISEASES AND BITING INSECTS OF THE PEACH CONTROLLED BY SUMMER SPRAYING.

SCAB (*Cladosporium carpophilum* Thum.). This is the disease that causes the hard black portion on the peach. It may cover only a small portion and do but little harm, but it often covers one side, sometimes causing cracks in the skin. While peaches not too badly infected with this disease are sold profitably, yet even a slight infection injures the appearance of the peach and thus must injure its selling quality.

If curculio and brown rot are not troublesome, spray about one month after the bloom falls, and again in about three weeks, using self-boiled lime-sulphur. (See article 32 for direction on making self-boiled lime-sulphur.)

BROWN ROT (*Sclerotinia fructigena* (P.) Schart.). Everyone is familiar with the rotting of peaches on the trees in summer. This rotting is practically always due to brown rot. It not only causes the peaches to rot on the trees, but often causes serious loss after the peaches are picked and started to market. It does some injury to the trees by striking back into the young twigs from the fruit. Brown rot is favored by hot wet weather. In a very large percentage of cases it gets into the peach through an opening in the skin by curculio.

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If curculio is not serious, spray with self-boiled lime-sulphur (see article 32) about one month after the bloom falls, and again in about three weeks, and if the peach is not an early variety, again about one month before the fruit is ripe. If curculio is serious it must be combated before spraying for brown rot to be as successful as it should be.

FIG. 19.—Portion of an apple limb showing injury by fruit tree bark beetle or pin-hole borer.

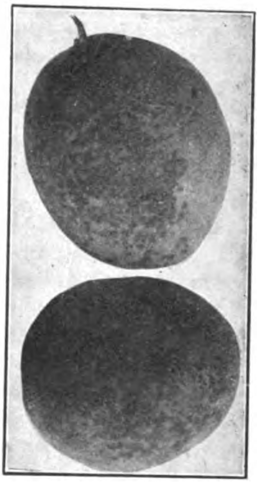

FIG. 20.—Scab on the peach.

FIG. 21.—Brown rot of the peach.

CURCULIO (*Conothrachelus nenuphar* Host.). In every section where peaches are grown for a considerable length of time, this insect is certain to become serious if it is not combated. The life history of the curculio in the peach is the same as that in the apple, except that a larger percentage of the eggs hatch and reach the adult stage and the curculio seems to prefer peaches to apples. It is thus a more serious pest of the peach than of the apple.

The curculio should be combated with arsenate of lead. The first spraying should be given just after the calyx tube (shuck) is off the little peach. The arsenate of lead should not be used at a strength greater than two pounds of the paste or one pound of the dry powder to fifty gallons of water, and there should always be added four or five pounds of lime. The second spraying should be about three weeks after the first, and only one and one-half pounds of arsenate of lead paste or three-fourths pound of the dry powder to fifty gallons of water should be used, and that with an excess of lime, say six or seven pounds.

Article 14.—COMBINED SPRAYING FOR CURCULIO, SCAB AND BROWN ROT.

First spraying. As soon as the calyx tube (shuck) has dropped from the little peach, with arsenate of lead paste two pounds, lime four or five pounds, water fifty gallons.

FIG. 22.—Young fruit of the peach. Two upper fruits ready for the first spraying for curculio; lower fruit still retains the calyx tube (shuck) so that spray could not cover it.

FIG. 23.—Borers in young peach.

Second spraying. Three weeks later, with arsenate of lead paste one and one-half pounds, self-boiled lime-sulphur 8:8:50. (See article 32.)

Third spraying. One month before the fruit is ripe, with self-boiled lime-sulphur 8:8:50. With early varieties like the Carmen the last spraying may be omitted, and where brown rot is not serious lime alone may be substituted for the self-boiled lime-sulphur in the second spraying with fair satisfaction.

Article 15.—DISEASES AND INSECTS OF THE PEACH THAT REQUIRE OTHER TREATMENT THAN SUMMER SPRAYING.

PEACH LEAF CURL (*Exoascus deformans* (Berk.) Fckl.). This disease causes the curling of the leaves shown in the figure. The leaves of the trees will fall early in the summer, and the vitality of the tree is thus reduced.

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It is usually controlled by spraying with lime-sulphur or Bordeaux mixture just before the buds burst.

PEACH YELLOWS. This is a contagious disease that is not well understood. It has become very serious in old peach-growing sections, and is recognized by the appearance of sickly yellowish foliage and clusters of willowy shoots on the trunks and large limbs. The fruit ripens prematurely and is small and generally has red spots distributed through the flesh.

Dig out and burn infected trees as soon as the slightest appearance of the yellows is observed.

PEACH ROSETTE. This disease is similar in many respects to yellows, but its appearance can be observed earlier in the spring. The trees usually die sooner. Along the limbs the leaf buds develop into compact tufts or rosettes.

The treatment is the same as for yellows.

SAN JOSÉ SCALE (*Aspidiotus perniciosus* Comst.). See under apple insects. (Article 6.)

The treatment for San José scale of the peach is the same as for apples, except that badly infested trees should be severely cut back and the brush burned before spraying.

PEACH LECANIUM (*Lecanium nigrofasciatum* Perg.). A reddish-black hemispherical scale, about one-eighth of an inch in diameter or smaller, that sometimes infests the twigs of peach trees. It generally is not numerous, but occasionally is found in sufficient quantities to seriously injure the tree.

Spray with a seven per cent kerosene emulsion just before the leaves reach full size. (For making kerosene emulsion, see article 41.)

BORERS (*Sannina exitiosa* Say). This is one of the most serious insects of the peach. It works around the base of the tree and may girdle and kill it. In Missouri it is usually more common than the apple tree borers.

It is combated by digging out the worms as directed for apples, and by wrapping and mounding the trees in the same manner to prevent the eggs from being deposited near the surface of the ground. A thick whitewash on the body of the tree is recommended by some instead of the wrapper, but it is not so effective. (See under apples, article 9; and also see article 49 for directions for making whitewash.)

FRUIT TREE BARK BEETLE (*Scolytus rugulosus* Ratz.). This beetle makes what is called "pin holes" in the limbs. They do not multiply rapidly in healthy trees and are not usually serious unless there are a number of weak trees in the orchard.

Cut out and burn all weak infested trees and limbs and keep the orchard in a vigorous, healthy condition. The whitewash suggested for borers may be of some benefit for healthy trees. (See article 49.)

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SPRAYING PLUMS.

Article 16.—DISEASES AND INSECTS OF THE PLUM.

BLACK KNOT (*Plowrightia morbosa* (Schw.) Sacc.). This disease appears as a black, rough swelling on the twigs.

Cut out the diseased parts as soon as they appear, cutting several inches below the knot on the twigs and branches. If the disease is prevalent in the neighborhood, spraying with Bordeaux mixture just as the buds swell in spring, and again just after the bloom falls, to prevent infection is desirable.

LEAF SPOT, LEAF BLIGHT OR SHOT HOLE FUNGUS (*Cylindrosporium padi* Karst.). This disease causes small round spots, and later holes, in the leaves.

Spray with Bordeaux mixture or self-boiled lime-sulphur when the calyx tube is off, and again in two or three weeks. Do not use the Bordeaux mixture on Japanese plums.

BROWN ROT (*Sclerotinia fructigena* (P.) Schrt.). This is the same disease as the brown rot of the peach. It affects the European and Japanese plums worst, and also the *Americani* type of American plums. Wild Goose, Wayland and others of the *Hortulana* type are not seriously affected. The Damsons are also largely resistant to the disease.

To combat brown rot of the plum: First, select varieties that resist it; second, control curculio; and, third, spray thoroughly with self-boiled lime-sulphur. The difficulty with spraying plums is that the spray does not stick well to the smooth surface of the plum, so spraying for brown rot of the very susceptible plums is not as satisfactory as spraying for it with peaches.

CURCULIO (*Conotrachelus nenuphar* Hbst.). This is the same insect that infests the apple and peach. It is more troublesome with plums than with peaches or apples.

Spray with arsenate of lead two pounds, lime three pounds, water fifty gallons, about the time the calyx tube is off, and again in two or three weeks.

Article 17.—COMBINED SPRAYING FOR BLACK KNOT, LEAF SPOT, BROWN ROT AND CURCULIO OF THE PLUM.

Frst spraying. Just as the buds are swelling, using Bordeaux mixture 4:4:50.

Second spraying. As soon as the calyx tube is off the young fruit, using Bordeaux mixture 2:4:50, and arsenate of lead two pounds; or self-boiled lime-sulphur 8:8:50 (see article 32) and arsenate of lead, two pounds; or boiled lime-sulphur, specific gravity 1.008 (see article 31), with the arsenate of lead and excess lime.

Third spraying. About two weeks after the second, using the same mixture.

Later spraying. As soon as brown rot appears, using Bordeaux mixture or self-boiled lime-sulphur.

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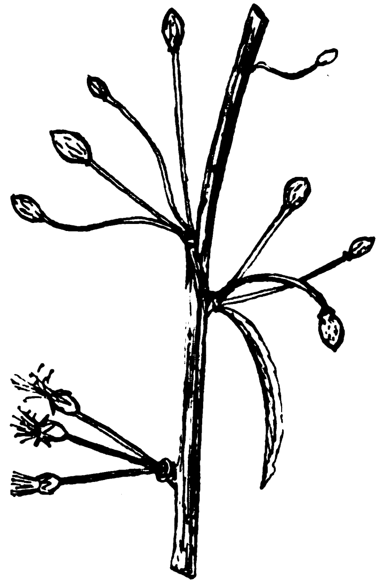

FIG. 24.—Young plum fruits. Upper fruits ready for first spraying for curculio; lower fruit still retains the calyx tube (shuck) so that the spray could not cover the surface.

FIG. 25.—Black rot in grape.

SPRAYING CHERRIES.

Article 18.—DISEASES AND INSECTS OF THE CHERRY THAT MAY BE CONTROLLED BY SUMMER SPRAYING.

LEAF SPOT (*Cylindroporium padi* Karst.). This is the same disease that infects the plum. (See article 16.) It is probably our worst cherry disease in Missouri.

It can be controlled by spraying with Bordeaux mixture 2:3:50 or self-boiled lime-sulphur 7:7:50 (see article 32) or commercial lime-sulphur of a specific gravity 1.008 (see article 31), when the leaves are out; again about three weeks after the bloom falls, and again as soon as the fruit is off. It is very important that cherry trees be sprayed for this disease if they are to be kept in healthy condition.

POWDERY MILDEW (*Podosphaera oxyacanthae* De Bary). With this disease the young shoots and leaves become covered with white patches, the leaves fall early, and the tree is much weakened. This disease is especially troublesome with young trees.

It can be controlled by spraying as directed for leaf spot. Young trees in the nursery should always be sprayed several times during the season with Bordeaux mixture 2:3:50, self-boiled lime-sulphur 7:7:50 (see article 32), or boiled lime-sulphur (see article 31).

CURCULIO (*Conothrachelus nenuphar* Hbst.). This is the same insect that affects apples, peaches and plums. It is also very troublesome with the cherry, and difficult to control.

It is possible to diminish curculio injury by spraying as soon as the caylx tube is off the young fruit, with arsenate of lead two pounds to fifty gallons of water, using either lime, self-boiled lime-sulphur or Bordeaux mixture to reduce the injury from the arsenate of lead. No later spraying can be given, since the fruit ripens too quickly and later sprayings would discolor the fruit.

PEAR SLUG (*Eriocampoides limacina*). This is the same insect described under the pear. (See article 10.)

It can be controlled by using arsenate of lead, unless the fruit is so near ripe that it should not be sprayed with arsenate of lead. In this case, dry slaked lime dusted on will kill the slug.

Article 19.—COMBINED SPRAYING FOR CHERRY DISEASES AND INSECTS.

First spraying. After the leaves have begun to come out, but before the blooms are open, using Bordeaux mixture 2:3:50, or some form of lime-sulphur. (See articles 30, 31 and 32.)

Second spraying. As soon as the calyx tube is off the young fruit, with arsenate of lead paste two pounds, and Bordeaux mixture 2:3:50; or self-boiled lime-sulphur 7:7:50; or boiled lime-sulphur, specific gravity 1.008. (See articles 30, 31 and 32.)

Third spraying. Just after the fruit is off, with Bordeaux mixture 2:3:50; or self-boiled lime-sulphur 7:7:50; or commercial lime sulphur 1.009. Arsenate of lead may need to be added to this for the slug.

SPRAYING GRAPES.

Article 20.—GRAPE DISEASES AND INSECTS.

BLACK ROT (*Guignardia bidwellii* (Ell.) V. & R.). This is the most serious enemy of the grape. The disease may be seen on the leaves as dark spots, showing larger on the under side of the leaves. It also affects the fruit, causing it to rot, the mummied fruit hanging on the bunches as shown in the figure.

The disease is not easily controlled when it has become serious. Spray with Bordeaux mixture 5:5:50 (see article 30), when about the third leaf is forming on the new shoot, just before the bloom opens, and again just after the bloom falls, and give two more sprayings at intervals of two weeks. If it is very rainy and the disease has been serious in other years, it will be necessary to give even more sprayings than this. A spraying just before a rain, however, will do more good than one given just after a rain. If the vineyard has been neglected, it may be impossible to entirely control the disease in a wet season, but it can be kept in check if spraying is done each year. It also pays to clean up the vineyard each year, cutting out all bunches of mummied fruit.

ANTHRACNOSE (*Sphaceloma ampelium* Be By.). This disease attacks the leaves, fruit and young shoots, causing dark brown spots on the leaves, and spots on the young shoots which are brown at first but later

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become grayish. On the berries it causes brown sunken spots. From the appearance of these spots, it is sometimes called bird's-eye rot. Often they are so deep that the seeds are exposed.

This is controlled in the same manner as black rot.

DOWNY MILDEW (*Plasmopara viticola* (B. & C.) Berl, De Tonte). This disease affects the fruit, foliage, flowers, and young shoots and tendrils. On the leaves it presents a whitish, downy appearance on the under side. The diseased fruits turn dull brown or bluish, and fall off in bunches.

This is controlled in the same manner as black rot.

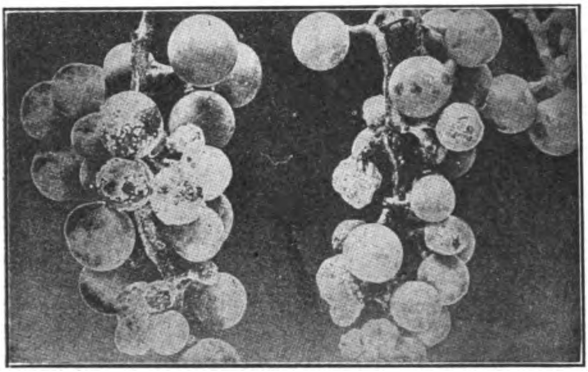

FIG. 26.—Grape affected with downy mildew.

INSECTS OF THE GRAPE. There are insects that infest the grape in Missouri, but none that are anything like so serious as the diseases.

PHYLLOXERA affects some varieties, but it is not seriously troublesome for varieties grown in Missouri.

PLUM CURCULIO. The fruit of the grape is not set early enough for the curculio to affect it in the early part of the season, and varieties that ripen in the early part of August are not usually injured by curculio. However, feeding punctures made by the curculio when it comes out in the fall may be found on the late-ripening varieties.

The best means of controlling this is by sacking.

SACKING GRAPES. Most of the serious diseases of the grape, and insects such as curculio on the late grapes, can be avoided by sacking; that is by covering the bunches with a two-pound paper bag, pinning it over the shoulder of the bunch at the top and having a hole in the bottom for the water to run out.

SPRAYING STRAWBERRIES.

Article 21.—DISEASES AND INSECTS OF THE STRAWBERRY.

LEAF BLIGHT (*Mycosphaerella fragariae* Tul. Linda.). This disease causes spots on the leaves such as those shown in the figure. With some varieties it very seriously weakens the plants. Varieties like Aroma and Gandy very largely resist it.

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Spray with Bordeaux mixture (see article 30) after the crop is harvested, probably after renewing has been done, and give three or four more sprayings at intervals of two weeks. On badly infected beds, after the crop is off, mow every thing down and let it dry, burn off when there is a brisk wind, and follow with a spraying.

FIG. 27.—Strawberry leaf showing strawberry leaf blight.

STRAWBERRY LEAF ROLLER (*Phoxopteris comptana* Frohl.). The adult of this insect is a moth that appears in the spring, depositing eggs on the leaves. When the eggs hatch, the larvæ feed upon the leaves, folding the leaves over and fastening them by means of a silken thread. They thus eat only on the inner side of this folded leaf. They sometimes seriously injure the plants, causing them to dry up. There are two broods a year. The second brood appearing shortly after the strawberries have been gathered.

The surest remedy for this insect is to mow down the plants and weeds and burn the bed off shortly after the strawberries have been picked. Spraying with arsenical poison when the berries are about half grown will kill the insect, but it is difficult to spray strawberries as they are so soon ripe after they set. The burning off process recommended does not seem to be entirely harmless to the strawberry field, as occasionally some plants will be killed and it will thus be more difficult to secure a good row for the next year.

STRAWBERRY FALSE WORM (*Harpiphorus maculatus* Nort.). The adult of this insect, a fly, appears in spring, depositing eggs on the leaves in April or early May. The eggs hatch in about two weeks into sluglike insects that eat holes through the leaves, sometimes skeletonizing them.

Since the insect feeds upon the leaves it can be killed by spraying. However, it is often difficult to spray with arsenical poisons without having some of the poison still on the fruit when it is ripe, since the strawberries are so soon ripe after they set. On a small bed, powdered white hellebore may be used at the rate of one pound in three gallons of water. This does not harm the fruit for eating purposes.

MAY BEETLE OR WHITE GRUB (*Lachnosterna fusca* Frohl.). The white grub that bothers us in the garden sometimes may be a fairly troublesome insect in the strawberry field. The insect feeds upon the roots of some plants, especially grasses. When the field is plowed up, if they are numerous they may feed upon the strawberry root and do considerable harm.

The remedy is to grow some other crop than grass or strawberries on the land until they are starved out.

Crown Borer (*Tyloderma fragariae* Riley). The adult of this insect is a beetle somewhat similar to the plum curculio. They deposit their eggs in June or early July. The eggs hatch into larvæ that eat their way into the crown, and there, in feeding, mine out the crown more or less.

These beetles do not migrate very badly, so the best remedy is to rotate the crop, putting no strawberries on land that has been in strawberries during the previous few years, provided these insects are serious.

SPRAYING BLACKBERRIES AND RASPBERRIES.

Article 22.—Diseases of the Blackberry and Raspberry.

Anthracnose (*Gloeosporium venetum* Speg.). This disease affects especially the black raspberry, but it is found also on the blackberry. Light-colored spots like those shown in the figure are to be observed on the canes. It may very seriously weaken the canes so that only a small crop can be ripened.

It pays to cut out and burn all infected canes. Spray with Bordeaux mixture when the leaf buds are about to open, and two or three other times at intervals of two weeks. The most important remedy is to get varieties that are resistant. Thus the Kansas black raspberry is not nearly so badly injured by anthracnose as most other varieties.

Orange Rust (*Gymnoconia peckiana* Howe). This disease affects the leaves and young shoots of the blackberry and raspberry. The spore bodies make orange-colored patches on the under side of the leaves.

Dig up and burn all plants showing any signs of the disease. Do not keep the planting too long on the same land, and use rust resisting varieties, such as Eldorado and Snyder.

SPRAYING GOOSEBERRIES AND CURRANTS.

Article 23.—Diseases and Insects of the Gooseberry and Currant.

Mildew (*Sphærotheca mors-uvæ* Schw. B. & C.). This disease shows a grayish white color on the leaves at first, later becoming dull brown. It also affects the fruit. The disease attacks both the gooseberry and currant.

Spray with Bordeaux mixture or potassium sulphide (see articles 30 and 33) just after the buds begin to swell, and at intervals of ten days until the fruit is picked. After the fruit is half grown, the potassium sulphide is more desirable than Bordeaux mixture, since it is more easily washed from the picked fruit.

Leaf Spot (*Septoria ribis* Desm.). This disease appears as large spots with pale centers and brown borders. It attacks both the currant and gooseberry.

Bordeaux mixture is necessary to control this disease. It should be applied when the buds are swelling, and at intervals of ten days or two weeks until the fruit is half grown.

Imported Currant Worm (*Nematus ventricosus* Comst.). The adult of this insect appears in April or May, and in about ten days the eggs

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hatch into dull, white larvæ, which later become yellowish green and dotted over with many black spots. When full grown they are about three-fourths of an inch long. They are ravenous feeders, and one brood may strip a bush of all of its leaves. There are two broods a year, so spraying will be necessary after the fruit is off.

For the first spraying use arsenate of lead with the Bordeaux mixture applied for leaf spot just after the fruit is set. If a spraying is necessary after the fruit is picked, use arsenate of lead, two pounds to fifty gallons of water.

CURRANT SPAN WORM (*Diastictis ribearia* Comst.). This is a small measuring worm that appears just as the leaves open. When it is full grown it is about one inch long. If disturbed the caterpillars drop toward the ground by means of a web.

They are combated in the same manner as the imported currant worm.

SAN JOSÉ SCALE (*Aspidiotus perniciosus*). This insect attacks the currant very readily, though it is not common on the gooseberry.

It is combated in the same manner as with apple and peach trees.

SPRAYING ASPARAGUS.

Article 24.—ASPARAGUS RUST.

ASPARAGUS RUST (*Puccinia asparagi* Dec.). This disease produces reddish-black pustules on the stems of the asparagus plants, and very greatly weakens them, so the crop the next year will be small.

Spraying with Bordeaux mixture does not control this disease. Dusting sulphur on the plants will control it in California, but this remedy would probably not be so effective in Missouri. The best means of combating the rust in Missouri is to first choose varieties that are least susceptible. The Palmetto variety seems to be much less susceptible than others, and it should generally be grown. Second, rust is not so serious on plants that are kept in a vigorous condition. Good cultivation to conserve an abundance of moisture is very highly desirable. One season irrigated plants on the Missouri Experiment Station grounds were almost entirely free from rust, while plants not irrigated suffered seriously from it.

SPRAYING POTATOES.

Article 25.—DISEASES AND INSECTS OF THE POTATO.

LATE BLIGHT AND ROT (*Phytophtora infestans* Mont.). This disease appears late in the season, during damp, muggy weather. At first it appears as small brown spots on the lower leaves, but if the weather remains wet, finally the whole plant will entirely decay. The tubers may also be attacked while in the field or after they are taken to storage.

To combat, plant potatoes only on ground that has not had infected potatoes growing on it. Use uninfected seed potatoes. Spray with Bordeaux mixture 5:5:50 when the plant is about six inches high, and give at least three more sprayings at intervals of ten days to two weeks.

EARLY BLIGHT (*Macrosporium solani* E. & M.). This disease appears early in the life of the potato plant and causes brown spots on the leaves. It is not so destructive as late blight, but by injuring the leaves it will diminish the crop.

Spray as directed for late blight.

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Scab (*Oöspora scabies* Thaxter). This disease causes the scabby appearance so often seen on potato tubers.

Do not plant on ground from which scabby potatoes have been dug. Keep from infecting the new land by dipping the seed potatoes for two hours in a mixture of one pint of formalin to thirty gallons of water before the potatoes are cut.

Colorado Potato Beetle (*Doryphora decemlineata*). This is a short striped beetle. The immature and full-grown insects both feed ravenously on the potato plants.

Fig. 28.—Colorado potato beetle.

Spray with arsenate of lead, two and one-half pounds to fifty gallons of water, as soon as the insect appears. If the field is being sprayed for blight or leaf spot, the arsenate of lead may be added to the Bordeaux mixture in the same proportion.

Flea Beetle (*Crepidodera* (*Epitrix*) *cucumeris*). These are small insects that have sucking mouth parts and puncture the leaves. The greatest danger is that the late and early blight may enter through these punctures.

Since they are sucking insects, they are not easily combated by spraying. However, Bordeaux mixture seems to do some good because it is distasteful to the insect, though it does not kill it.

SPRAYING TOMATOES.

Articles 26.—DISEASES AND INSECTS OF THE TOMATO.

Damping Off (*Pythium de baryanum* Hesse). This disease appears as a rotting of the stem near the top of the ground in the plant bed.

It can be largely checked in many cases by careful watering. Water only when necessary, and then water very thoroughly. By this method the ground near the top may be dry most of the time and infection prevented. The soil in the plant bed should not be a soil infected with the disease, that is, it should not be a soil on which plants that have

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shown this trouble have been previously grown. A layer of dry sand scattered over the surface, followed by a spraying with Bordeaux mixture, may be beneficial.

BACTERIAL WILT; BLIGHT (*Bacillus solanacearum* Erw. Smith). This disease appears as a shedding of the foliage and browning of the wood. The infected plants wilt first at the top; later the entire plant turns yellow, wilts and dies.

Spraying with Bordeaux mixture or other fungicides does not control this disease, except that the use of Bordeaux mixture seems to reduce the number of punctures from flea beetles, and this will diminish the number of points of infection. A crop of tomatoes should not be grown on soil where tomato plants have previously shown this disease. The plants should not be grown in a plant bed where this disease has been observed.

LEAF SPOT (*Septoria lycopersici* Sperg.). This disease produces small, roundish, dark-brown spots on the leaves and stems. The lower leaves are attacked first and die and fall off. The vitality of the plant is reduced and the crop is diminished, especially in the latter part of the season.

This disease is successfully controlled by spraying with Bordeaux mixture. The first spraying should be given before the plants have been taken from the seed bed; the second five or six days after transplanting; the others should be given at intervals of ten days or two weeks when the tomatoes are beginning to mature. If the tomatoes are grown for city market, where only the first to ripen are profitable, it may not be profitable to spray.

DOWNY MILDEW (*Phytopthora infestans* De By). See under Late Blight of Potatoes (article 25).

TOMATO WORM (*Phlegathontius celeus*). The tomato worm is too common to need description.

It may be controlled by picking them off, which is very troublesome and disagreeable, or it can be entirely controlled by spraying with arsenate of lead, two and one-half pounds in fifty gallons of water, when the worms appear. If it is necessary to spray when the fruit is ripe, of course the fruit should be washed or the spray rubbed off of it before it is eaten. There is no great danger from its use, however, since the amount of arsenic present is so small as to be practically harmless.

CUT WORMS. Cut worms are too common to need description. They may be controled, to some extent at least, by the use of bran mash containing Paris green or some other arsenical poison in little piles over the field.

FLEA BEETLE (*Crepidodera* (*Epetrix*) *eueumeris* Sal.). See under Potatoes (article 25.)

SPRAYING BEANS.

Article 27.—DISEASES AND INSECTS OF THE BEAN.

ANTHRACNOSE (*Colletotrichum lindemuthianum* Sacc. & Mgn., Bri. & Cav.). This disease causes brown pits or spots on the pods, stem and leaves. It is carried over from one season to another in the seed. It

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is imperative, therefore, that the seeds used be free from this disease. If it is not certain that they are free, it is well to soak the seed in a strong ammoniacal copper carbonate solution (see article 34), or possibly dip them in Bordeaux mixture. The plants should be sprayed with Bordeaux mixture when they are two or three inches high, and again in ten days, and once more after the small pods have set.

WEEVIL (*Bruchus obtectus*). This insect deposits eggs in the pods of the growing plants, and breeds also in the stored seed.

It is combated by treating the seed with carbon bisulphide, one ounce to each one hundred pounds of seed. Of course the seed should be in a tight box. The liquid is poured on the top of the beans and the box tightly closed. Care should be taken in handling carbon bisulphide, since if it catches fire it will explode.

SPRAYING CABBAGE, CAULIFLOWER, KALE, ETC.

Article 28.—DISEASES AND INSECTS OF THE CABBAGE FAMILY.

BLACK ROT (*Pseudomonas campetris* (Pamel) Erw. Smith). This disease is first noticed on the outer leaves of cabbage, cauliflower, kale, etc., the leaves turning yellow and dying in spots. The veins turn dark-brown or black. From the margins the disease progresses downward to the stems, and from them upward through the center of the head. In addition to cabbage, the disease also affects turnips, kale, cauliflower, and other plants of this type.

Black rot can not be controlled by spraying. Infection must be kept out of the seed; therefore, cabbage should not be planted the second year on land where any indications of this disease have been observed, and infected cabbage or turnips should not be fed to stock if the manure is going to be used on the place where cabbage is to be grown, or in the plant bed. Especially avoid the use in the plant bed of any soil or manure that could possibly be infected with the disease. During the season watch closely and remove all affected leaves as soon as they appear, since this may prevent the disease from getting into the main stem and from there back up into the head.

CUT WORMS. These are well-known insects that cut off the young plants at the top of the ground.

Use bran mash with Paris green or other arsenical poison in little piles over the patch, or dust flour containing Paris green, one ounce to a quart of flour, on the plants. This last will run down to the ground, and the cut worms eating it will be killed. In some small gardens this last remedy has been found very satisfactory.

CABBAGE WORMS (*Pieris rapae*). This well known worm of the cabbage plant is the larva of the white butterfly that is always seen flying about the cabbage field.

Spray with arsenate of lead until the head is say one-half to two-thirds as large as when we intend to cut it. There is little danger, however, from spraying with arsenate of lead even near the time the cabbage is to be used, since the outer leaves of the head will always be discarded. On account of the slick, waxy nature of the surface of the cabbage leaves, the water containing the spray mixture does not

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spread over the leaves, but runs together into drops and rolls off. If common laundry soap is dissolved in the spray at the rate of two bars to fifty gallons of the spray, the liquid will then spread over the leaves in a very satisfactory manner. This soap is most quickly dissolved by boiling it in about a gallon of water. The spray mixture should be stirred vigorously after the soap solution is poured into it.

HARLEQUIN CABBAGE BUG (*Murgantia histronica*). This is the bright-colored bug, nearly one-half an inch long, that is often seen on the kale, cabbage, etc. It comes in large numbers in early spring.

It can not be controlled by spraying with a spray that does not also injure the cabbage plants. It may sometimes be killed by planting radishes in the cabbage patch and spraying them with kerosene when the insect is feeding upon them, thus killing the insect as well as the radish plants.

SPRAYING CUCUMBERS AND MELONS.

Article 29.—DISEASES OF CUCUMBERS AND MELONS.

DOWNY MILDEW OR LEAF MOLD (*Plasmopara cubensis* B. & C. Humphrey). This disease develops in hot, damp weather, causing angular brown spots on the leaves; often causing the death of the entire leaf.

Spray every two weeks with Bordeaux mixture for cucumbers. This spraying does not seem to be effective on melons.

STRIPED CUCUMBER BEETLE (*Diabrotica vittata*). This is a yellow and black striped beetle which appears in large numbers and destroys the foliage badly.

It may be combated, first, by covering the plants with a cheese-cloth frame; second, in some cases the number of punctures from it may be reduced by spraying with Bordeaux mixture and arsenate of lead, as this sprayed on the leaves seems to be distasteful to the insects; third, probably the most important, sow enough seed in the hill that some of the plants may be injured and yet leave enough healthy plants for a good stand.

MELON PLANT LOUSE (*Aphis goseypii*). This is a small sucking insect similar to the other plant lice mentioned, and may entirely cover the leaves of the melons or cucumbers, causing the premature death of the vines.

It may be combated with kerosene emulsion if spraying is thorough. (See article 41.) However, the best remedy is to spray with some form of tobacco extract, such as Black Leaf Forty, or home-made tobacco tea. (See articles 43, 44, 45.)

FUNGICIDES OR SPRAYS FOR PLANT DISEASES.

Article 30.—BORDEAUX MIXTURE.

This fungicide is made by combining a solution of sulphate of copper (blue vitriol) with a solution of lime. The resulting substance is not soluble in water, but very slowly goes to the bottom of the liquid. It is a flocculent, pasty substance that sticks exceedingly well to the leaves.

The strength of Bordeaux mixture is generally given in terms of fifty gallons. Thus standard Bordeaux mixture 4:4:50 means that there are four pounds of sulphate of copper, four pounds of lime and fifty gallons of water. Bordeaux mixture 2:3:50 means that there are two pounds of sulphate of copper, three pounds of lime and fifty gallons of water.

VALUE OF BORDEAUX MIXTURE. Bordeaux mixture is one of the oldest and the best known and most widely used fungicides. It will control more fungous diseases than any other known fungicide used for spraying. Thus it is effective on apples against apple scab, bitter rot, apple blotch, and practically all other fungous diseases which may be controlled by summer spraying. It sticks to the foliage better than any known fungicide, and is probably slightly less expensive than any other fungicide of equal effectiveness.

BORDEAUX INJURY. While Bordeaux mixture is a very effective spray, it is usually fairly harmless to the fruit and foliage. However, there will likely be a slight yellowing and browning of the leaves due to injury from the use of Bordeaux mixture. Another more serious injury is observed on the fruit. The apples may sometimes be coated with russet caused by injury to the skin from Bordeaux mixture. The two sprayings at which this injury is to be observed are those just after the bloom falls, when the apple is still coated with a tender, hairy covering. At this time the skin is very easily injured, and if Bordeaux mixture is used, it is used at a strength not greater than two pounds of bluestone and three of lime to fifty gallons of water.

EQUIPMENT FOR MAKING BORDEAUX MIXTURE. The first essential for making Bordeaux mixture is a supply of lime and sulphate of copper, from which it is made. Before the spraying season begins, it is certainly desirable that enough sulphate of copper be purchased to last through the second spraying after the blooms fall. If the orchard is in a section where there has been great danger from frost, it may be desirable not to order more than this amount and to place a second order when it is plain there is going to be a crop. However, the first three sprayings may be given before we know whether or not there will be a crop, and it is so important that they be given at the right time that sufficient sulphate of copper to give them should always be ordered during the winter.

The price of sulphate of copper will vary from five to eight cents, usually six or seven cents being the price in barrel lots. If the lime can be secured from local dealers of course it may be purchased as needed. The lime used should always be fresh stone lime of good quality. If it is impossible to secure this stone lime, a fair grade of Bordeaux mixture may be made from hydrated lime. In this case, however, we should use one and one-third times as much as we would use of stone lime. Thus in the case of 4:4:50 Bordeaux mixture, we should use about five and one-half pounds of hydrated lime.

The sulphate of copper and lime must be brought together in very dilute solutions for the best Bordeaux mixture. The sulphate of copper requires a considerable length of time to dissolve in water, and considerable time is required for slaking the lime. For these reasons it is best to have a mixing plant for making Bordeaux mixture. This mixing plant should consist of a stock solution tank in which enough sulphate of copper may be dissolved to last through one spraying, if not through several. The sulphate of copper is usually dissolved in water at the rate of one pound to the

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gallon, so it is only necessary to dip from the stock solution tank one gallon in order to get one pound of sulphate of copper. Then there is necessary for the lime an elevated slaking box, in which the lime may be slaked and drawn down into a stock solution tank. In this case also one pound of lime should be dissolved in a gallon of water. The lime of course should be weighed before this slaking. Two dilution tanks, such as is shown in the figure are also necessary, one for sulphate of copper and the other for lime. In these tanks the substances are diluted before they are run together into a mixing tank or the spray tank. All of these tanks should be on an elevated platform, so that the liquid can be run out of them into the spray tank below. Where water pressure is not available an elevated water tank is needed to supply water to these stock solution tanks, or in some cases a good pump run by a gasoline engine may take the place of the elevated water tank. In this case the water would be pumped direct from a pond or well into the stock solution tanks and the dilution tanks.

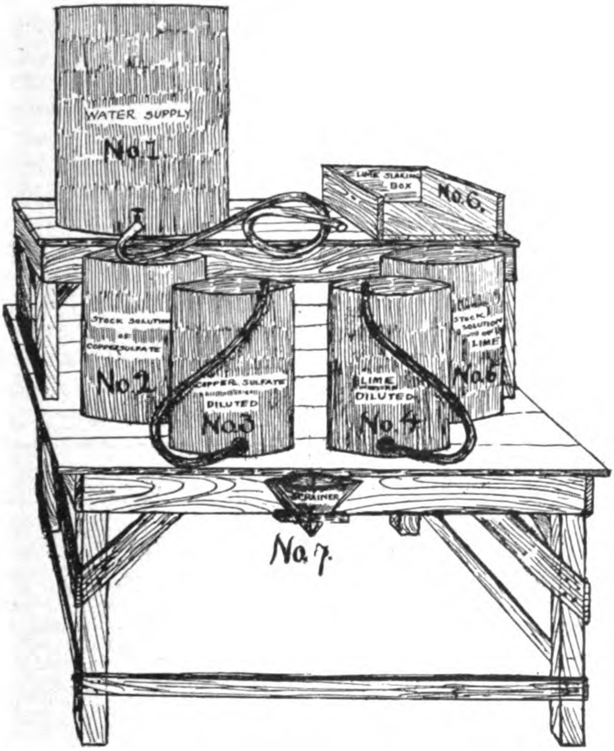

FIG. 29.—Equipment for mixing Bordeaux mixture. No. 1, elevated water supply tank. No. 2, stock solution tank for sulphate of copper. No. 5, stock solution tank for lime. No. 6, elevated slaking box for lime. No. 3, tank for diluting sulphate of copper solution. No. 4, tank for diluting lime solution. Nos. 3 and 4 each have attached a hose through which the diluted solutions are run together through the strainer into the spray tank. No. 7, a strainer.

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A good strainer is an essential part of the equipment. There are various types of strainers, but probably one like that shown in the figure where the strainer comes together in the center, making four slanting surfaces through which the liquid can run, is the most desirable type. This allows the sediment to settle down toward the bottom, leaving plenty of straining surface about it.

MAKING BORDEAUX MIXTURE. The process of making Bordeaux mixture with a plant like this would then be as follows: First, in making the sulphate of copper stock solution, assuming that the tank holds 100 gallons, the tank should be filled nearly full of water, then 100 pounds of the sulphate of copper should be weighed out and placed in a gunny sack or some other porous material and suspended just in the top of the liquid. If it is poured into the bottom of the barrel it will be some months probably before it would all be dissolved unless hot water is used. Then assuming that the lime stock solution barrel holds 100 gallons, we should weigh out 100 pounds of good stone lime, slake it in the elevated slaking box, and draw it out, usually through a strainer, into the lime stock solution tank, and fill the tank up to 100 gallons.

Now suppose it is desired to make 200 gallons of Bordeaux mixture at a strength of 4:4:50. After stirring, sixteen gallons of the sulphate of copper stock solution should be dipped into the sulphate of copper dilution tank and this tank filled up to 100 gallons. Then the lime stock solution barrel should be stirred thoroughly and sixteen gallons dipped from it into the lime dilution tank. Then the contents of these dilution tanks should be run through a strainer into a separate mixing tank or directly into the spray tank.

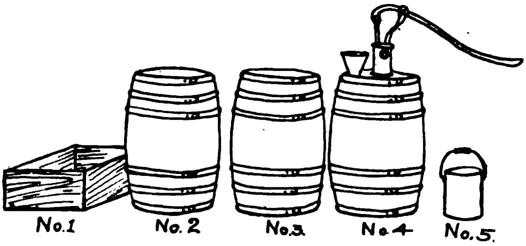

FIG. 80.—Equipment for mixing Bordeaux mixture in a small way. No. 1, lime slaking box. No. 2, stock solution barrel for lime. No. 3, stock solution barrel for sulphate of copper. No. 4, barrel spray pump. No. 5, bucket for dipping and measuring stock solutions. Two such buckets would be highly desirable.

If it is desired to make only 100 gallons of the mixture, one-half of these quantities should be used in all cases, or if it is desired to make only fifty gallons of the mixture, one-fourth of these quantities should be used.

In the same manner, if a mixture of 2:3:50 is desired, to make 200 gallons, eight gallons of the sulphate of copper stock solution would be dipped into the dilution tank and water to make 100 gallons added; and twelve gallons of lime stock solution would be dipped into the lime dilution tank and water to make 100 gallons added.

With small orchards where a mixing plant would be too expensive, only a stock solution barrel for sulphate of copper and one for lime need be used. Then if fifty gallons of 4:4:50 Bordeaux mixture is to be made, dip four gallons of the sulphate of copper stock solution into the spray barrel, add ten or twelve gallons of water, dip four gallons of the lime stock solution into the same spray barrel and fill it up with water.

COMBINING BORDEAUX MIXTURE WITH INSECTICIDES. When Bordeaux mixture is being used there will likely be also insects to control, and it is nearly always practiced to combine arsenate of lead with Bordeaux mixture. For 200 gallons of Bordeaux mixture, eight to twelve pounds of arsenate of lead paste or four to six pounds of dry arsenate of lead would be mixed with sufficient water to make it into a thin paste and poured into the spray tank with the Bordeaux mixture.

Article 31.—LIME-SULPHUR.

The boiled lime-sulphur, such as can be purchased from a large number of firms or can be made at home, was used at first only as an insecticide. However, it has come to be used very largely as a summer fungicide. In the summer, when the leaves are on, it can not be used at anything like so great a strength as that at which it is used when the tree is in the dormant condition.

VALUE OF LIME-SULPHUR AS A FUNGICIDE. A considerable number of tests of lime-sulphur as a fungicide have been made, and in nearly all cases it has proved a valuable spray against apple scab and some other of the less important summer diseases. However, against apple blotch and bitter rot it has not been effective. It can not, therefore, take the place of Bordeaux mixture in sections where these diseases are prevalent. The reason for using lime-sulphur instead of Bordeaux mixture is that it causes somewhat less injury to the fruit. Thus as a rule apples sprayed with lime-sulphur are not russeted, and they therefore have a better color than those sprayed with Bordeaux mixture.

LIME-SULPHUR INJURY. Lime-sulphur, however, does cause considerable injury to the foliage under some conditions. The injury to the foliage from the use of lime-sulphur can be readily told from the injury due to the use of Bordeaux mixture. In the case of Bordeaux mixture the injury never appears soon after the spraying is done, while in the case of lime-sulphur, if there is to be any injury to the foliage it will begin to appear almost as soon as the leaves are dry after the spraying. The lime-sulphur injury is greater with a drenching spray, thus the first spraying after the bloom falls, which must be a drenching spray, is likely to be the one when lime-sulphur injury will show greatly.

DETERMINING THE STRENGTH AT WHICH LIME-SULPHUR SHOULD BE USED. In determining the strength to use lime-sulphur, it should always be reckoned in terms of specific gravity. Usually the lime-sulphur should not be used on the foliage at a strength shown by a specific gravity greater than 1.009. To determine the specific gravity of the concentrated lime-sulphur solution, it is necesary to have a hydrometer such as that shown in the figure. It would be very much more convenient if the orchardist should secure a hydrometer with the specific gravity readings on the scale, instead of Beaumé readings from which a table must be consulted to determine the specific gravity. Several companies make these hydrometers at the present time.

To determine the specific gravity of the concentrated lime-sulphur, lower the hydrometer into the deep glass vessel filled with lime-sulphur and note the reading just at the top of the liquid. Now, to determine the number of gallons of water to be added to one gallon of concentrated lime-sulphur, divide the decimal of the specific gravity of the concentrated lime-sulphur by the decimal of the standard it is decided to use. Thus, say the specific gravity of the concentrated lime-sulphur is 1.270, we would divide the decimal of this figure by the decimal of our standard, which is 1.009; thus .270 divided by .009 would give 30. We would thus add one gallon of the concentrated lime-sulphur to thirty gallons of water.

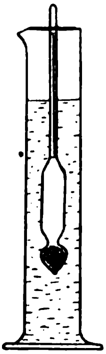

FIG. 31.—Hydrometer for testing the strength (specific gravity) of concentrated lime-sulphur solution.

FIG. 32.—A desirable form of kettle for cooking lime-sulphur.

Assume that the specific gravity of the concentrate was 1.288, then .288 divided by .009 would give us 32. In this case we would add one gallon of the concentrated lime-sulphur to thirty-two gallons of water. It will thus be seen that the use of the hydrometer makes it possible for us to be accurate in diluting the lime-sulphur. It further makes it possible for the orchardist to know the value of the lime-sulphur he may be buying. Thus, if a barrel of lime-sulphur should show a specific gravity of 1.24 and another should show a specific gravity of 1.28, the last would be one worth one-sixth or 16⅔ per cent more than the former. Since the specific gravity is determined by the amount of the sulphur compound in the solution, the greater the specific gravity the more valuable the lime-sulphur.

MAKING LIME-SULPHUR. Lime-sulphur equal to anything that can be purchased can be made at home by the orchardist. To make a barrel (fifty gallons) of lime-sulphur, sixty pounds of lime and one hundred and twenty-five pounds of sulphur should be used. The lime may be slaked and made into a thin paste and the sulphur added to this, and the two together worked into a paste and this poured into a cooking kettle or tank. Enough water should be added that with the evaporation there will still be left fifty gallons after the cooking. The liquid should then be brought to the boiling point, and kept boiling for one hour. This boiling is best done with steam turned in at the bottom, since the steam would thus stir the liquid as it cooks. However, equally good lime-sulphur can be made by boiling in a kettle with fire underneath. In this case, however, the liquid must be constantly stirred while over the fire. If a kettle is used it should hold about fifteen gallons more than the fifty gallons, since the evaporation will be greater with this method than if steam is turned through. After the boiling is over, the liquid should be clear red. This should be drawn off into tight containers and kept so that it is not exposed to the air, and probably it should not be permitted to freeze.

The lime used for making lime-sulphur should be a good grade, and the sulphur may be either flowers of sulphur or sulphur flour, light or heavy.

COMBINING LIME-SULPHUR WITH ARSENATE OF LEAD. Since this lime-sulphur is to be used as a substitute for Bordeaux mixture, just as in the case of Bordeaux mixture, it is desirable to combine it with an insecticide, and spray for both insects and diseases at the same time. It has been found that arsenate of lead may be very satisfactorily combined with the lime-sulphur in summer spraying. For 200 gallons of the lime-sulphur eight or ten pounds of arsenate of lead paste will be needed. This can best be added by pouring it into the filled spray tank after mixing it with a quantity of water sufficient to make a thin paste.

Article 32.—SELF-BOILED LIME-SULPHUR.

Neither Bordeaux mixture nor the boiled lime-sulphur are desirable as a summer spray for peaches under Missouri conditions. Recently, through the agency of Professor Scott of the Bureau of Plant Industry, a spray has come into use that is entirely harmless to the foliage of peaches if properly made. This is self-boiled lime-sulphur. It is commonly used at a strength of about eight pounds of sulphur and eight pounds of lime to fifty gallons of water. Probably a strength not so great as this would be entirely effective. Only good stone lime should be used in its making, and either flowers of sulphur or sulphur flour may be used. The following are the directions given by Professor Scott, the introducer of this spray, for making:

"Place the lime in a barrel, and pour on enough water to start it to slaking and to keep the sulphur off the bottom of the barrel. Then add the sulphur, which should first be worked through a sieve to break up the lumps, and finally pour in enough water to slake the lime into a paste. Considerable stirring is necessary to prevent caking at the bottom. (This stirring may be done very satisfactorily with a hoe.) After the violent boiling which accompanies the slaking of the lime is over, the mixture should be diluted ready for spraying, or at least enough cold water added to stop the cooking. Five to fifteen minutes are required for the process, according to whether the lime is quick-acting or sluggish.

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The intense heat seems to break up the particles of sulphur into about the physical condition of precipitated sulphur, and the violent boiling makes a good mechanical mixture of the lime and sulphur. Only a small percentage of the sulphur—enough to improve the adhesiveness of the mixture—goes into solution, but if the hot mass is allowed to stand as a thick paste, the sulphur continues to unite with the lime, and at the end of thirty or forty minutes enough of the reddish liquid is produced to burn peach foliage, and even apple foliage in some cases. Hence, the necessity for cooling the mixture as soon as the lime is well slaked.

"The mixture should be strained through a sieve of twenty meshes to the inch in order to remove the coarse particles of lime, but all the sulphur should be worked through the strainer."

This fungicide has not only proved entirely harmless to peach foliage, but has proved very satisfactory against both scab and brown rot of the peach, where curculio is also controlled. It may also be used on apple or cherry or other fruit trees as a fungicide. However, with these fruits it is not as satisfactory as with peaches, since it is coarse and is washed off very readily. The hairy covering of the peach holds the lime-sulphur in a very satisfactory manner.

LESS IMPORTANT FUNGICIDES.

A number of other fungicides may be used in some cases. The following are given, with directions for their making:

Article 33.—Potassium Sulphide.

Potassium sulphide (liver of sulphur) is often used when spraying for certain mildews. It is used at the rate of one ounce of potassium sulphide in two or three gallons of water.

This is the most satisfactory spray against the powdery mildew of roses, and is sometimes used on gooseberries when the fruit is so large that the staining from Bordeaux mixture would be undesirable.

Article 34.—Ammoniacal Copper Carbonate.

Copper carbonate	6 ounces.
Strong ammonia (just enough to dissolve the carbonate) about	3 pints.
Water to make	50 gallons.

It is sometimes necessary to spray fruit when it is ripe, and the use of Bordeaux mixture at that time would stain the fruit. Under such conditions, the ammoniacal copper carbonate may be a desirable spray, if the fruit is valuable. Following are the directions:

Dissolve the copper carbonate in the ammonia, using no more of the ammonia than will barely dissolve the copper carbonate. When all is in solution add fifty gallons of water and it is ready for use.

Article 35.—Copper Sulphate Solution.

Sometimes instead of the ammoniacal copper carbonate, a very weak solution of copper sulphate is used. The following formula is recommended by Professor Taft, of Michigan:

Copper sulphate	1 pound.
Water	50 gallons.

It is very important that this be used in a very dilute form, since we do not use lime to render it insoluble.

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Article 36.—FORMALIN SOLUTION.

Formalin	1 pint.
Water	30 gallons.

Used for potato scab, etc. (See article 25, under Potato Scab.)

POISONOUS INSECTICIDES.

Article 37.—ARSENATE OF LEAD.

This is by far the most valuable arsenical poison. It is most commonly sold in the form of a paste containing about 50 per cent water, though at the present time it is also being sold to a considerable extent as a dry powder. In the latter case there is no water, and hence only one-half as much of the arsenate should be used. The two features of arsenate of lead that make it the most important arsenical spray are: first, it sticks better to the foliage than any other, and second, it is less harmful to the foliage. If care is taken it can even be applied on peach trees when in leaf without serious injury. In the paste form it is used at the rate of two to three pounds in fifty gallons of water on apples. It is never used on peaches stronger than two pounds to fifty gallons of water, and then it should have lime added to decrease the injury to the foliage.

In using arsenate of lead it should first be stirred in a small vessel of water into a thin paste, and then poured into the spray tank at the time of filling. If large quantities of the arsenate are being used, a special apparatus, like an old churn with a dasher, for working it into a paste is desirable.

The arsenate of lead may be made at home by the following formula:

Lead acetate	24 ounces.
Arsenic of soda	8 ounces.
Water	100 gallons.

Use only the very best chemicals in making this preparation. Dissolve each of the materials in a separate bucket half full of water. After both are thoroughly dissolved, pour them together into another bucket and allow the mixture to stand for a few hours. A white precipitate or sediment is formed, which is the arsenate of lead. All of the bucketful should be added to a spray tank containing 100 gallons of water; and it is then ready for use.

It is more satisfactory, however, and usually cheaper, to buy it ready prepared.

Article 38.—PARIS GREEN.

Up to the introduction of arsenate of lead, Paris green was the most important insecticide. It is commonly used at the rate of one pound to 100 or 175 gallons of water or Bordeaux mixture. It should never be used on peaches, and even when used on apples it should always have five or six times as much lime as Paris green, to reduce the injury to the fruit and foliage. To use, it is mixed into a thin paste with a small quantity of water and then poured into the spray tank. If the dry powder is poured into the water in the spray tank it will not mix, but will float on top.

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Article 39.—HELLEBORE.

The powdered roots of white hellebore are at times recommended as a substitute for the arsenicals, especially upon fruit which is ripe or nearly so. It is applied dry, either full strength or diluted with from three to four parts flour or air-slaked lime, or in water at the rate of a pound or more to 50 gallons. In mixing it would be best to steep the hellebore in a few gallons of the water for a few hours and dilute with the remainder of the water. It acts as an internal poison to insects, but is harmless to man in the quantities recommended. It is more expensive than the above-mentioned insecticides.

CONTACT INSECTICIDES.

Article 40.—LIME-SULPHUR.

This is the same as the boiled lime-sulphur discussed as a summer fungicide. (See directions for making, article 31.) It is one of the most valuable contact sprays for insects, especially the San José scale. When used as an insecticide it is used at a strength of 1.03. The method of determining the strength of the concentrated lime-sulphur solution and the amount of water to be added will of course be the same as when it is used as a fungicide. Thus assuming that the specific gravity measured with a hydrometer is 1.27, and we choose to use it at a strength of 1.03; then .27 divided by .03 gives us 9, or we would use one gallon of the concentrated lime-sulphur with nine gallons of water.

Article 41.—KEROSENE EMULSION.

This is probably the most important summer contact spray. It is made according to the following directions:

Kerosene (coal oil)	2 gallons.
Hard soap	½ pound.
Water (soft)	1 gallon.

For use, mix with seventeen gallons of water.

This is a ten per cent kerosene emulsion; however, a seven per cent emulsion is generally satisfactory. Then you would use approximately one and one-half gallons instead of two gallons of kerosene in the above solution.

Dissolve the soap in boiling soft water, adding the kerosene as soon as all of the soap is dissolved. Mix by pumping back into the tub with the spray pump for fully ten minutes. A thick, creamy emulsion is formed, from which the oil does not readily separate. For use, mix this emulsion with seventeen gallons of water. If the stock solution has become cold it may be necessary to soften it up so as to mix more freely with the water by using some hot water. This is especially valuable in fighting plant lice and other soft-bodied insects which suck the juices of plants.

Article 42.—MISCIBLE OILS.

Other sucking insect sprays than kerosene emulsion, in fact of which kerosene emulsion is one, are the miscible oils. These are oils so treated that they will mix with any proportion of water, generally giving a white emulsion. These should not be used unless they emulsify. Sometimes, under certain conditions when put into water the oil comes to the top in-

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stead of making an emulsion, in which case it should not be used. In fact, the company should be asked to make it good unless it has been frozen often. Some of the widely known miscible oils are "Scalecide," Target Brand Scale Destroyer, San-u-zay, etc.

Article 43.—TOBACCO EXTRACT.

Tobacco extract is another important contact insecticide. It is made as follows:

Tobacco stems or tobacco dust	1 pound.
Water	2 gallons.
or	
Tobacco leaves	1 pound.
Water	4 gallons.

The tobacco should be placed in cold or hot water and brought to a boil. Some of the fire should then be removed and the water allowed to simmer, but not boil, for one hour.

BLACK LEAF. The most satisfactory tobacco extract known to the writer is Black Leaf, manufactured by the Kentucky Tobacco Products' Company, Louisville, Ky.

To use Black Leaf, stir the contents of the can thoroughly and pour out the required amount, using as directed by the manufacturer. If Black Leaf or Tobacco Tea is being used as a summer spray for plant lice, arsenate of lead may be added, if necessary, to kill biting insects.

LESS IMPORTANT INSECTICIDES.

Article 44.—TOBACCO DUST.

This is used for putting around the tree trunks for wooly aphis. This is especially true in the case of apple trees in the southern part of Missouri. It is important that this dust be in a finely ground condition.

Article 45.—TOBACCO STEMS AND APHIS PUNK.

Insects are sometimes killed by fumigating where the plants can be enclosed, and of the materials used one of the most important is tobacco stems, which are burned. Aphis punk, a nicotine paper prepared in rolls so it can be burned, is also made use of, and in some cases is more desirable than the stems. It can be secured from the Nicotine Manufacturing Company, St. Louis, Mo. Of course in fumigating for insects, the work must be done in an air-tight chamber, or one nearly air-tight.

Article 46.—PYRETHRUM.

This is a yellow-colored powder made by pulverizing the flowers of the pyrethrum plant. It owes its poisonous properties to a volatile oil, and while it kills all kinds of insects—escpecially when enclosed in a room or box—it is harmless to man and all kinds of domesticated animals. It is essential, in order to have success in the use of pyrethrum, that one obtain fresh material, and also material that is pure. Pyrethrum powder loses its poisonous properties in a very short time, and hence can not be kept over from one season to another, even in an air-tight jar. It is better to order this material from some reliable wholesale drug house as needed.

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Fresh pyrethrum powder can be applied as a dry powder, either unadulterated or mixed with common flour, in the proportion of one pound of pyrethrum to three pounds of flour, or it can be sprayed on the plants by mixing a pound of pyrethrum in three gallons of water. Pyrethrum has no injurious effects whatever on any plant. It is used sometimes on strawberries or other small fruits when they are ripening.

Article 47.—HYDROCYANIC ACID GAS.

Another good fumigant is hydrocyanic acid gas, made as follows:

Fused cyanide of potassium (98% pure)	1 ounce.
Sulphuric acid (concentrated)	1 ounce.
Water	2 ounces.

This is sufficient for one hundred cubic feet of space, and exposure to it should not be made longer than one hour. Fumigating with this gas must be done in a tight box or room to secure efficiency against insects and to protect animals and men from injury due to escaping gas. *This gas is very poisonous and must not be inhaled for even a moment.*

Empty the water into a glass vessel and pour the acid slowly into this. After weighing out the proper amount of potassium cyanide, tie it up in a cloth sack just large enough to hold it. An old tobacco sack is just right. Place the jar of acid where it is wanted. Drop into it the sack of cyanide and quickly close the box or run out of the room, shutting the door tightly. This gas is especially useful in nursery fumigation. No insect can withstand thorough fumigation with it.

Article 48.—CARBON DISULPHIDE.

This is very effective against insects in stored grain. Place a quantity on top of the seed. The fumes are heavier than the air and settle through the bins of seed. It ignites very easily and must be protected from fire. Two pounds of bisulphide of carbon should be used for every one thousand cubic feet of bin space, regardless of the amount of seed in it.

Article 49.—WASH FOR TREES.

The following wash may be desirable for fruit tree borers, bark beetles, rabbits, etc. It costs more to use it than the wood veneer wrapper and it is not as effective, so its use is seldom practical.

Dissolve as much washing soda as possible in six gallons of water, then dissolve one gallon of soft soap in this and mix with it enough freshly slaked lime to make a thick whitewash. Apply with a brush, first removing the rough bark.

Article 50.—SPRAYING EQUIPMENT.

In spraying, especially where any of the copper compounds are to be used, all of the important parts of the spray pump that come in contact with the copper compounds, such as Bordeaux mixture, copper carbonate, etc., should be of brass. The receptacle, tank, barrel, or whatever the case may be, should be of wood or painted metal, as these sprays corrode the unpainted metal badly.

AGITATION. Many of the materials used in spraying are insoluble and will settle to the bottom. For this reason in nearly all sprayings the

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machine should be provided with a good agitator. If there is no agitator, and you are spraying with something like Bordeaux mixture or arsenate of lead, you will spray out a different strength toward the last than what you had at first when the tank was full. Thus, part of the tree may receive a spray strong enough to burn the leaves, while another part will not receive a spray strong enough to combat the diseases or insects.

Among agitators, especially in a power sprayer, the propeller agitator is probably the best. At any rate the agitation should be thorough.

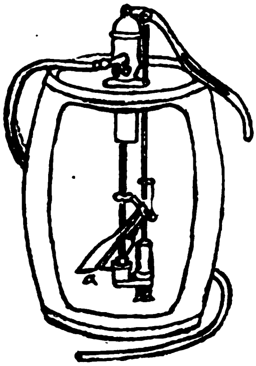

FIG. 33.—A barrel spray pump showing agitator at (*a*).

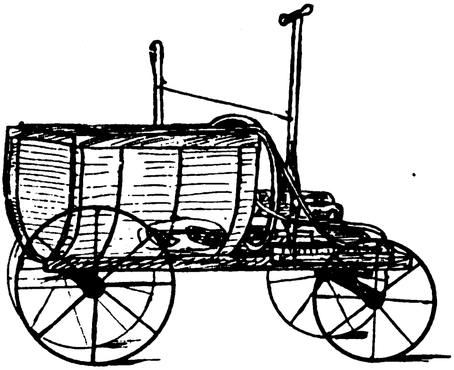

FIG. 34.—Large hand spray pump with tank showing section of agitator.

Hand Sprayers. To spray a small orchard or garden, a barrel pump will be sufficient. If a fair sized orchard is being sprayed with a hand pump, a strong man should be at the pump; and it would be better if a pressure gauge is placed where the man can see how much pressure he is making, so he will work a little harder, for spraying should always be done, for the best results, at a high pressure. The high pressure is not only better, but is cheaper as the men get over the orchard faster.

With an orchard of five to ten or fifteen acres, a large, low down, hand pump like the one shown in the figure will be more satisfactory than a barrel pump, since much better pressure may be maintained by one man. in this case at least a hundred gallon tank should be used, and an agitator something like that in the adjoining figure should be used.

Power Sprayers. A large orchard should be provided with a power sprayer, if the orchard is considered worth giving good care. In a large orchard, generally speaking, it would be best if there were a power sprayer for each thirty acres at most, and many of the best orchardists who are spraying carefully maintain that twenty or twenty-five acres is enough for one power sprayer.

In buying a power sprayer, several features should be considered. In rough land one of the most important would be lightness. The sprayer should be short and light, so that it would be convenient in turning and running over the rough land. The same would be just as true of muddy land. Generally speaking, it is very important that a sprayer be light.

Then the engine should be one that will run all day at a pressure as high as 200 pounds. Of course a pressure lower than this will do the work, but if an engine will get hot and stop at a pressure of 200 pounds when it is new, when it gets old it may get hot and stop at a much lower pressure. In fact 200 pounds is a good pressure to run at.

The writer considers the gasoline power sprayer the best type of power sprayer for apple and peach orchards under Missouri conditions. There may be others that will give as uniform and satisfactory power, but the power is generally not secured so cheaply.

AUTOMATIC SPRAYERS. The automatic power sprayer, in which the power is secured by the movement of the wheel of the truck, is desirable for spraying such crops as grapes, tomatoes, potatoes, and small trees, where the truck can be kept moving a considerable portion of the time; but for large trees, where the truck remains still much of the time, they do not seem to be desirable.

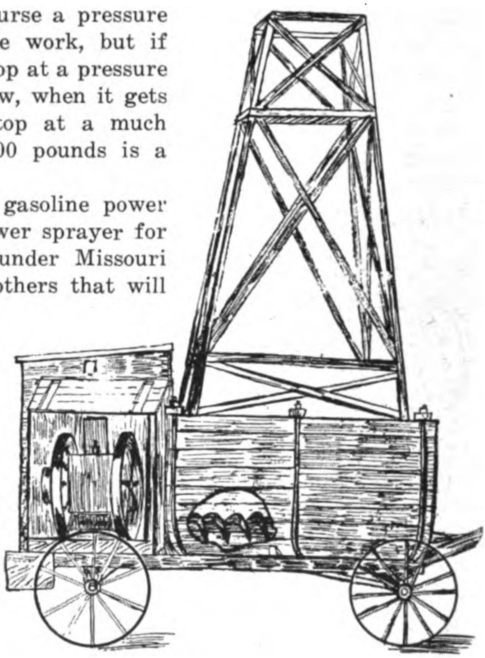

FIG. 35.—Gasoline power spraying outfit with tower for man who sprays the top of the tree. Section of a screw propeller agitator shows in the tank.

HOSE. The equipment of the power sprayer, such as the hose, nozzles, extension rod, shut-off, etc., are important. For spraying, the hose should not be weaker than five-ply. It is always best to get a very high grade of hose, especially if the work is to be done under high pressure. One should always take along some extra hose clamps and possibly some wire and a pair of pliers.

EXTENSION RODS. The extension rod should be light, and possibly the most satisfactory extension rods are made of bamboo lined with brass. A ferrule should project over the bamboo at each end so the strain will not be on the brass rod. Small iron pipes make fairly good extension rods.

NOZZLES. The nozzle, except for the first spraying after the bloom falls, should generally be one of the vermorel type, that is, a type where the spray is made by a whirling motion given the liquid before it comes out through a hole in the end of the nozzle. This type of nozzle is able to break the spray into a very fine mist. The nozzle should always allow of adjustment so as to throw the spray upward or downward. A nozzle directing the spray straight from the end of the extension rod will generally not reach all parts of the tree with the liquid. The small vermorel nozzle is not large enough for the power sprayer, but all of the power-sprayer companies have a modification of the vermorel that is large

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enough to carry the spray for the high pressure. Sometimes even with the large nozzles two are used on the end of the extension rod.

Article 51.—SPRAYING METHODS.

As already mentioned, it is well to do the spraying under as high pressure as possible. Excepting the first spraying after the bloom falls, we want the spray broken into a mist so fine that it will not tend to be in drops large enough to roll off. In all sprayings, the spray should

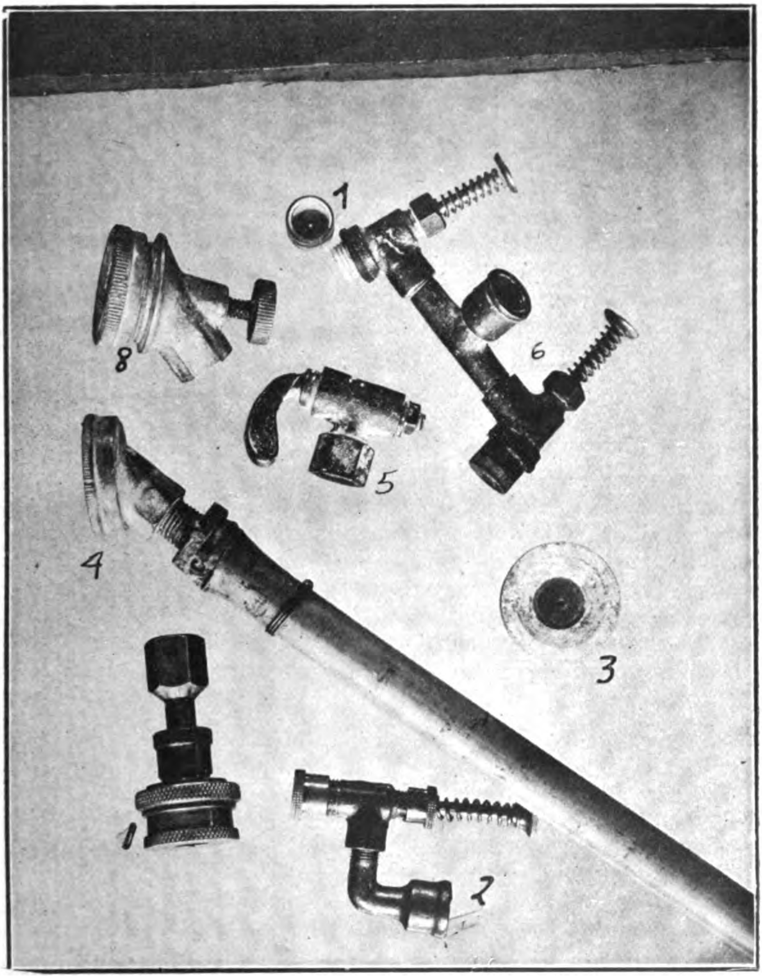

FIG. 36.—Spraying nozzles. No. 6 is a double vermorel with cap at No. 7 screwed off to show the opening through which the spray passes. Nos. 1, 3, 4 and 8 are larger nozzles of the vermorel type adapted to the power sprayer. No. 3 shows the larger opening through which the spray passes. With most of the nozzles of this type, disks with large or small openings to make a coarse or fine mist may be obtained. Nos. 4 and 8 show a good angle for nozzles so that the spray may be directed either upward or downward conveniently. No. 5 is a Bordeaux nozzle which is used only in spraying the first time for codling moth just after the bloom falls when a coarse spray is wanted.

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be directed upward and downward so that all parts of the leaves, fruit, etc., may be well covered.

In the first spraying after the bloom falls on apples, it is important that the spray should be directed with a strong force, downward, so that the liquid will penetrate the calyx of the fruit. For the same reason the spray should be coarser than it is at other times.

It is very important that we do our spraying thoroughly. Every part of the tree should be thoroughly covered. The nozzle should be pushed in among the twigs and directed both upward and downward. However, we should not direct the spray long enough in one place so that the liquid will collect and run off the leaves.

In using a power sprayer, it is well to have three leads of hose, the man on top that does the driving spraying the top of the tree, and two men spraying the lower parts of the tree, one on each side spraying from the ground.

In using Bordeaux mixture, any that is left in the tank at quitting time at night had probably better be discarded.

It is seldom necessary to spray trees that are not bearing, and barren trees in the orchard may be omitted. Where scab or cankerworms are bad, the trees that are not bearing would need to be given one spraying during the early part of the season.

Article 52.—DUST SPRAYING.

A great many people, disliking to go to the expense and trouble of spraying with a liquid spray, have been using a dust spray, and a great deal has been said about it, but the experience of Prof. F. W. Faurot, of the Missouri State Fruit Experiment Station, and Prof. Charles S. Crandall, of the Illinois Experiment Station, as well as others, would indicate that the orchardist had better use the liquid spray. Some dust sprays seem to have considerable value in combating insects, but even then it is enough less effective than the liquid spray so that a good orchardist can not afford to use it. In combating fungous diseases the dust spray seems to be almost worthless, and orchardists are advised to let it alone.

Article 53.—PROTECTING TREES AGAINST RABBITS.

With young trees, rabbits often constitute one of the very worst pests that the orchardist has to deal with. Where the orchards are valuable enough, they may be combated by means of rabbit-proof fences. In sections where a great many orchards are located, by combined efforts of the growers the rabbits may be killed out in the community. In a large percentage of cases, however, they will have to be combated by protecting each individual tree.

There are a number of appliances for protecting the trees against rabbits, but probably by far the best, if not also the cheapest, is the wood veneer wrapper. These are simply very thin strips of tough wood about ten inches wide by eighteen to twenty-four inches high that are wrapped around the trees. The best ones have the base of the wrappers treated with a preparation to prevent rotting. The wood veneer wrapper, before being used, should always be moistened so it will wrap around the tree without splitting. The wrappers are then placed around the trees with the base pressed closely against the soil, and are fastened with a small wire. The work would be more rapid if these wires were cut the proper length before going into the field. The ends of the wire are given only one twist. Sometimes one wire is used and sometimes two.

These wood veneer wrappers are beneficial also in protecting the trees against borers, so after they are put on it is well to mound the soil up about them two or three inches around the base.

Cost and all considered, the use of the veneer wrapper is to be recommended in nearly all cases. The cost of the wrappers will vary from $4 to $6 a thousand, depending on the height. The usual price is about $5 a thousand for wrappers twenty inches high. They may be secured from almost any box and basket company.

Probably the next most important means of protection against rabbits is the use of heavy wrapping paper. This paper should be in strips about twenty inches wide and should be wrapped around the tree in at least two thicknesses, extending to the ground at the base. It should be tied at the top, bottom and middle, and since it is also valuable in protecting against borers, the earth should be mounded slightly at the bottom as in the case of the veneer wrapper. In a few cases rabbits have been know to tear this paper off.

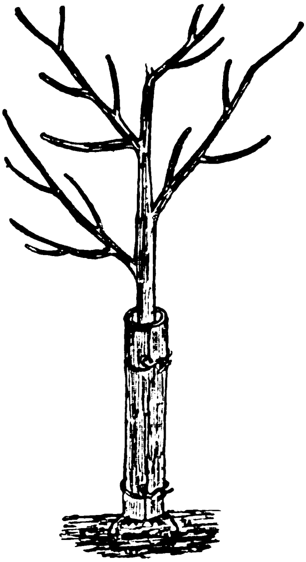
FIG. 37.—Young apple tree with a wood veneer wrapper, having the earth mounded around it at the base, for protection against both rabbits and borers.

Wrapping with wire netting is also satisfactory, though more expensive than the above methods. A coil-spring of heavy wire around the tree seems to be a very satisfactory protection against rabbits, though these would afford no protection against borers.

If the orchard is small and none of these materials are available, wrapping trees with pieces of corn stalks about twenty inches long set up around them and tied is entirely satisfactory. Old newspapers wrapped several times around are also used. Tie securely at top, bottom and middle.

Article 54.—PROTECTING TREES AGAINST MICE.

Mice also do a considerable amount of damage in some orchards, girdling the trees at the top of the ground. The most important means of avoiding injury from mice is to scrape all rubbish away from the trees on the approach of winter, so the mice will not be encouraged to burrow near them. If the orchard is in sod, the grass should be pulled away from around the trees in fall. Wrapping the trees with veneer wrappers and mounding, or with heavy wrapping paper or wire netting, will also tend to avoid injury from the mice.

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MAKING THE COUNTY FAIR EDUCATIONAL.

By C. W. PUGSLEY, in *The Nebraska Farmer.*

"The ordinary county fair is not fulfilling as useful a mission in the country as it ought." This is a statement often heard from people in all walks of life. These objectors say that it seems to be the object of many county fair boards to furnish entertainment only. It is true that these criticisms do not apply to all of the county fairs held in the central west, but they do apply to many. I have checked over the premium lists of a large number of county fairs, and found by far the larger proportion of premiums awarded to the competitions of the racing track—largely horses, but including in this latter day, automobiles and motorcycles. The proportion of money awarded to purely agricultural products I have found very small indeed.

One fair manager said to me, "I wish a lot of these people would attempt to manage a county fair for a while. They certainly must know that it takes money to pay premiums and that the managers must necessarily put in attractions that will bring money to the management. If it were not for some of the things that these good people are kicking about, there would be no premiums for the live-stock and agricultural exhibits."

I can sympathize with the managers, and I know how hard it is to get exhibits of products purely agricultural, or even industrial, which will draw crowds and bring in money at the gates. I would be inclined to believe it practically impossible to run a county fair without the race-track or without objectionable sideshows, if it were not for the fact that there are a number exceedingly successful where these questionable features have been eliminated.

WHAT DO PEOPLE DEMAND?

Another fair manager said to me that he retained only the features which were demanded by the people. He took the ground that the thing most desired by the people was the thing for which they would pay their good money. But is this always true? Or, if it is true, is it best for society to encourage spending money for things which give only harm? I mistrust that if this manager should put to a vote of the people of his county the matter of amusements that he would find the citizens have a very wholesome type of mind, and that some of the things which are commonly found at his fair would be voted out if the people had an opportunity.

On the other hand, there are many of the citizens who will patronize the things which are certainly questionable. I do not object, and I think very few people do, to wholesome sideshows which are for the purpose of entertainment almost entirely, providing there are no objectionable features. Neither do I object to exhibitions of skill; and exhibitions of speed. These are perfectly legitimate, and have their place on any county fair program. The matter, however, of brnging into a county a large

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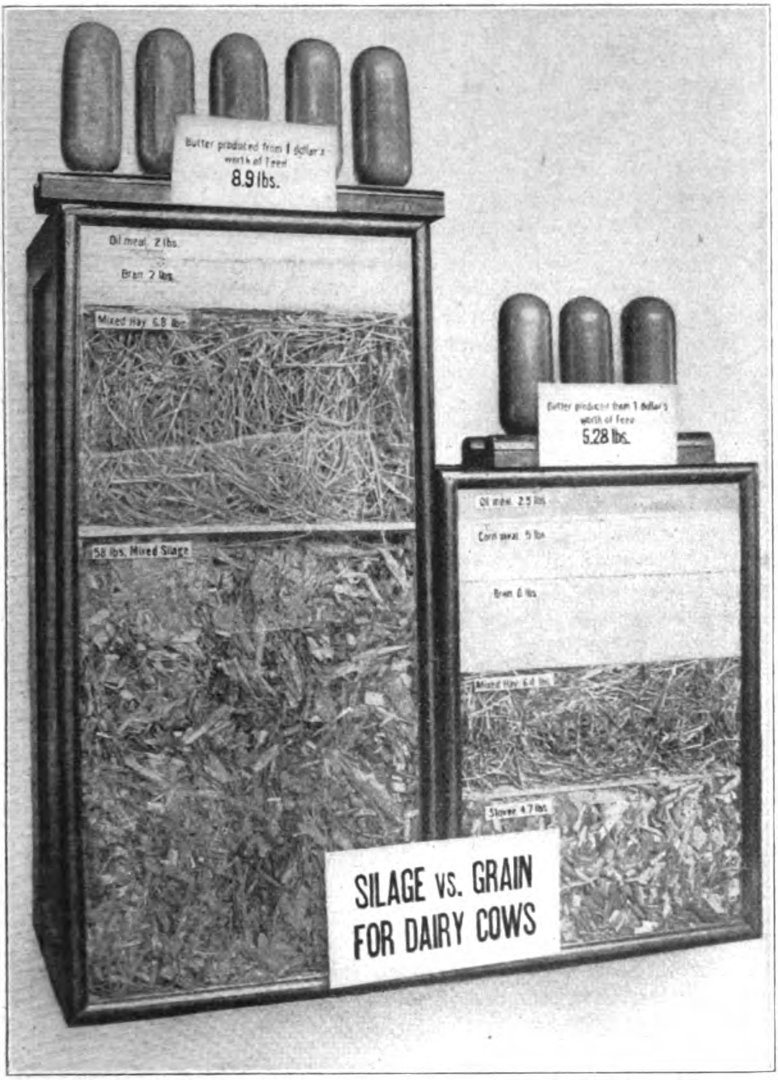

1. One of the exhibits of the Ohio Station.

number of racing horses, good for nothing but racing purposes, owned outside of the county and usually outside of the state, maintained merely to make fair circuits and pull down the purses, is an entirely different matter.

One of the questions in the minds of the county fair managers of to-day is: "Can our fair be educational and entertaining at the same time?" I think it can. I would not eliminate the wholesome entertainment features, but would introduce the educational. I will confine this article largely to what might be done along the line of an educational exhibit of an agricultural nature, and I will base it largely upon what has been done in Ohio by the Association of County Fair Managers coöperating with the Ohio Agricultural Experiment Station.

THE OHIO EDUCATIONAL PLAN.

The Ohio plan is unique. Each department at the station, under the direction of the person in charge, prepares exhibits which graphically illustrate the experiments they have been carrying on. The effort is to make these exhibits plain; to put them in such a shape that the farmer who is not accustomed to reading and thinking in scientific terms can get their meanings at a glance. The exhibits are so arranged that those from the various departments all fit into one harmonious whole. Uniform cases are prepared and uniform lettering used. When a complete exhibit is assembled it is so constructed that the boxes are easily packed for shipment. A tent of the best quality is used and the tent together with the exhibits makes a carload. This carload is scheduled by the Association of County Fair Managers on a series of runs and makes during the fair season as many points as possible.

The managers of each fair visited are required to sign a contract with the experiment station. That contract in brief covers the following points:

1. The station agrees to install one of its exhibits in a tent thirty-five by sixty feet at the county fair on a certain date.

2. The station provides not less than three men to explain the various features of the exhibits.

3. All the above is done without expense to the fair association, except as hereinafter noted.

(a) The fair association agrees to thoroughly advertise the exhibits.

(b) The fair association agrees to provide a suitable site for the station tent—not to be closer than 200 feet to any amusements, games of chance, or equally objectionable features.

(c) Lumber needed to build tables, racks, etc., must be furnished by the fair association, also drayage, and four men to assist in installing and taking down the exhibits.

(d) Ample police protection to be provided night and day.

Such a contract is signed by the president and secretary of the county fair board and by a representative of the experiment station. The station so far has not been able to supply the demand for these exhibits. They have three tents and three crews in the field during the entire fair season, and are now considering the installation of the fourth.

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THE PLAN IS POPULAR.

It takes money to carry on educational work in this manner, but the people of Ohio are so sure that the benefits they receive are worth the while that they are urging the station to increase the equipment and are anxious to have their legislature make appropriations for the work.

In conversation and correspondence with L. H. Goddard of the Ohio station, who was largely instrumental in starting the educational work at the county fairs, I learn that at the present time the county fair managers are excedingly anxious to secure exhibits from the station. In a letter of recent date he makes the following statement: "As soon as the managers found out the value of these exhibits there was a struggle to see who should have them, and no trouble whatever was experienced in our receiving all the appropriation we needed for the work. On several occasions we have had to go before the finance committees of the legislature to oppose an undue advance in the appropriation. This is a work which you can only expand about so fast."

THE OHIO EXHIBITS.

Let us see what the Ohio people have shown at their county fair exhibits and also glance at some of the things other stations could show in such an exhibit. A tent is owned by the station, and is always in charge of three or more representatives of the station. It is made of the best material and is large enough to accommodate the exhibits and a large crowd at the same time.

The attendants in charge explain the details of the exhibits. Lectures are also held at stated periods and the attendance at these is very gratifying. These exhibits cover all lines of experiment station work. They show in a simple manner the results of fertilizing tests. Comparative yields are shown graphically by grain in sacks and by hay in bales. On the cards are printed the amount of profit obtained by certain fertilizer treatments. On the table are exhibits of fungous diseases and plant pests of various kinds. In another part of the tent are shown some of the results of the corn breeding work. Everything is plain, simple, and properly labeled, and the young men without coats and with badges are always ready to explain the details.

Illustration No. 1 gives a near view of one of the exhibits. This is an illustration of the results of some feeding tests of silage vs. grain for dairy cows. It can be seen at a glance that a ration composed of silage, hay, bran and oil meal produced 8.9 pounds of butter from a dollar's worth of feed, while a ration composed of stover, mixed hay, bran, corn meal and oil meal produced only 5.28 pounds of butter from a dollar's worth of feed. With butter at 30 cents per pound this would mean that a dollar in one instance returned $2.67 and in the other only $1.57. If details of these experiments are desired by the visitor they can be obtained from the helpers in charge of the exhibits.

Very few exhibits of this nature have been made by the Nebraska station, because of lack of funds. Several departments, however, have got together certain exhibits, and I am having these illustrations shown in connection with this article.

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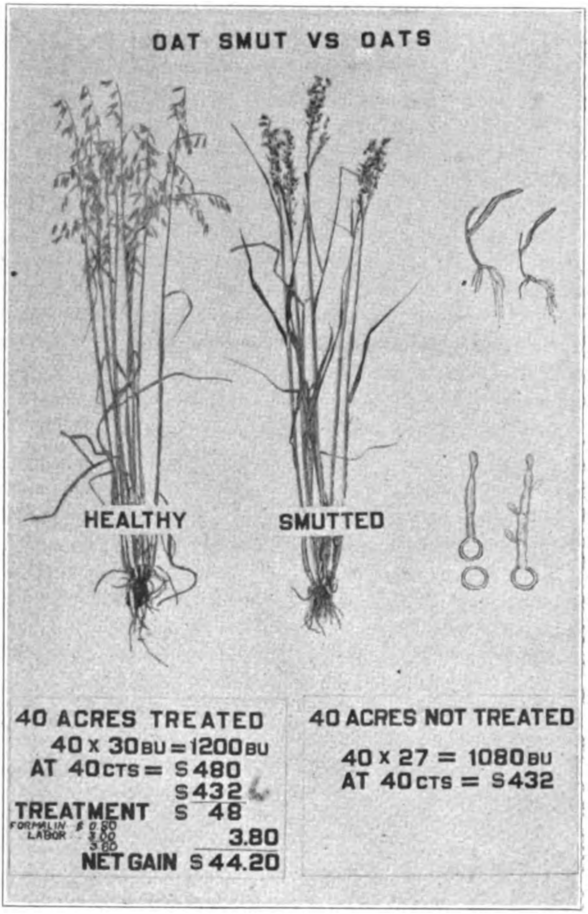
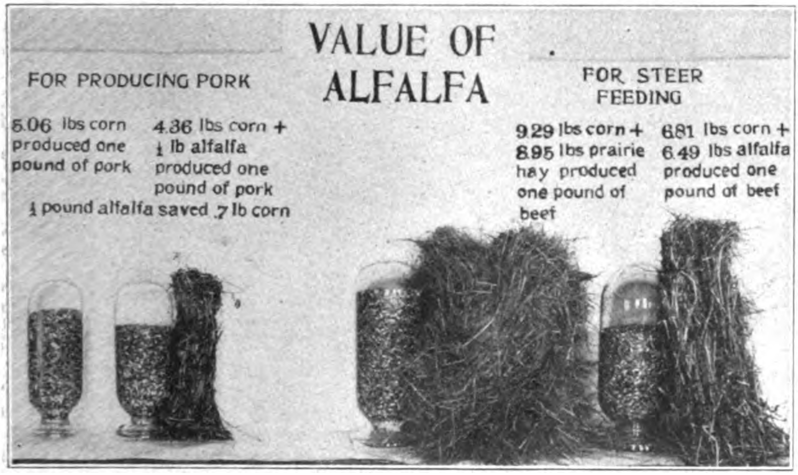


2. **Effect of treating oats for smut—Nebraska Experiment Station.**

Illustration No. 2 shows some of the work being done by the department of agricultural botany. Two plants of oats are shown, one healthy and one affected with smut. It is estimated that on a forty-acre field over one dollar per acre, or $44.20 net, gain could have been made by the treatment of seed with formalin. The treatment of oats for smut is not the only thing being investigated by the department; there are numerous other diseases which have simple remedies and which could be shown in exhibits of this kind. The methods of treatment are simple and cheap and could be easily explained by assistants in attendance. The work with potato diseases would lend itself admirably to such an exhibit.

The value of alfalfa in feeding rations for hogs and cattle as found by the experiments of the animal husbandry department is shown in illustration No. 3. It was found that one-half pound of alfalfa hay saved seven-tenths of a pound of corn when a ration of alfalfa and corn was compared with corn alone. This means that a ton of alfalfa hay worth $10 saved fifty bushels of corn worth $25, making the farmer a profit of $15 net. It was also found that it took considerably less alfalfa hay and corn to produce a pound of beef than it did prairie hay or corn. Many valuable tests of this kind have been reported in the various station bulletins, and could be graphically illustrated in a movable exhibit.

Illustration No. 4 shows the difference in yielding power between some of the different strains of wheat being tested at the station. A graphic arrangement of this, as well as of other effects of plant breeding, could be easily made for exhibition purposes, and would show the visitor of such an exhibit at a glance the value of plant breeding work and of improved strains of wheat.



3. Value of alfalfa for producing pork and beef—Nebraska Experiment Station.

A COW'S ACHIEVEMENT.

A remarkable state of affairs is shown in illustration No. 5. Katy Gerben is a cow owned by the Nebraska Station. Her average monthly production of milk has been 1615 pounds, yielding 64.7 pounds of butter, worth, at 25 cents per pound, $26.17. The production of the average Nebraska cow per month is only 310 pounds of milk yielding thirteen pounds of butter worth $3.25, or a difference of $22.92 in Katy's favor. At the side of the exhibit is shown the amount of feed eaten by each cow. Figure up the profits from each.

In illustration No. 6 is shown a comparison of the amount of corn secured from Nebraska cornfields before the fields were seeded down to clover and alfalfa and the amount produced after the fields were plowed up. These were from reports of thirty-one Nebraska farmers. The average of the fields before plowing was 34.5 bushels per acre, while the average of the fields after was 68.2 bushels, or practically twice as much.

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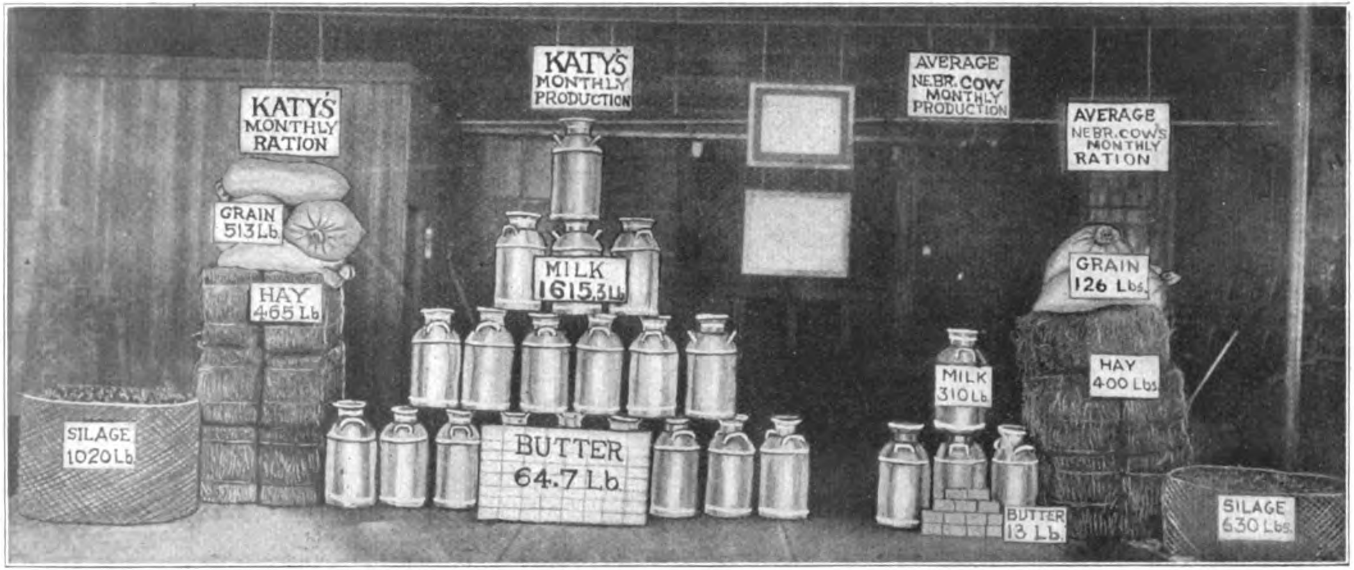

4. Monthly production of Katy Cerben compared with average Nebraska cow—Nebraska Experiment Station.

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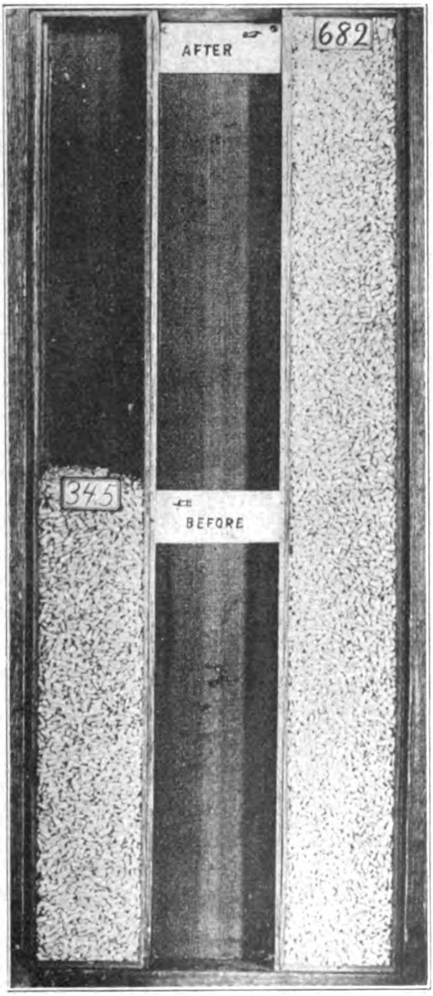
Illustration No. 7 shows the apples produced from a sprayed tree and from an unsprayed tree. Many lessons can be drawn from the work which has been done by the department of horticulture in spraying of fruit. In fact coöperative demonstrations with orchards are now in progress in several parts of the state. These exhibits at county fairs could be renewed year after year, thus bringing the work up to date.

SHOWING CORN FACTS.

There could be shown the amount of gain secured at the Nebraska Experiment Station on an average of four years by rolling winter wheat in the spring. A fifty-acre field would yield $255 more if rolled than if not rolled when wheat is worth $1 per bushel.



5. Effect of clover and alfalfa in rotation upon yield of corn.

An exhibit could show the gain which could be secured by the use of native grown seed corn as compared with imported seed. Some farmers have a notion that seed brought in from eastern states where they grow larger ears, and especially where they grow corn which will take the prizes at the shows, would give better results, but the work at the Nebraska station has shown conclusively that good seed which has become adapted to Nebraska conditions will yield more than seed brought from a distance. On a fifty-acre field planted with seed which was home grown the yield was 48.8 bushels per acre or a total of 2400 bushels. Where the seed was brought from a distance of not more than sixty miles from the station, the yield was reduced 160 bushels, or at 50 cents per bushel the fifty-acre field yielded $80 less money. Where the seed had been brought in from eastern states (and by the way this particular seed was from samples which had won prizes at the National Corn Exposition) the yield was reduced 450 bushels, or $225 on the fifty-acre field.

From the interesting standpoint, it might be mentioned that the work of the agronomy department has shown that under the conditions which exist at the Nebraska station, every pound of dry weight produced in a corn plant requires 275 pounds of water; while for every pound of dry weight produced in a sunflower, 450 pounds of water is required. Feeding experiments with hogs, dairy cattle, beef cattle and sheep would add largely to the collection of exhibits, coöperative fertilizer tests with the farmers, inoculating experiments with alfalfa, work on the diseases of plants, the spraying of fruit trees, the results with hog cholera serum, proper construction of silos and a hundred and one other things could be shown.

These things are all reported in bulletins, but bulletins fail to reach the spot. Some are not written in the farmer's language, others are too long, and few are as convincing as properly constructed exhibits based on the work given in the bulletins. Such exhibits shown at a fair in each county would reach a large proportion of the rural population, and help to make the county fairs educational in the highest sense.

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Part II.

Animal Husbandry.

Fairfax 16th 316931, senior and grand champion Hereford bull at Iowa, Nebraska, Kansas and Missouri state fairs and American Royal Show in 1912.

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ANIMAL HUSBANDRY.

OPPORTUNITIES IN LIVE-STOCK RAISING.

By W. S. CORSA, White Hall, Ill., at the board's forty-first annual meeting.

"There is a tide in the affairs of men that, taken at the flood, leads on to fortune." The great dramatist's definition of opportunity is of such universal application that it covers many a live-stock story. One night, coming down from the north on the train with that eminent Short-horn breeder, Frank W. Harding, he told me the story of his purchase of the famous White Hall Sultan. Upon arriving at the home of the owner, Mr. Harding went directly to the bull's stall. After walking around him and viewing him with that critical judgment and discrimination which every Short-horn breeder knows is in the Harding blood and training, Mr. Harding provided himself with a more or less comfortable box, and, perched upon this, first from one corner and then from another, he watched in quiet and at great leisure every move and pose of the white bull. After several hours of watching and mental weighing, Mr. Harding returned to town, satisfied of Sultan's outstanding excellence, but still unwilling to pay the outstanding price, and concluded to return home without making the purchase. While waiting for his train he happened to look over the hotel register, and among the recent arrivals his eye fell on the name of another Short-horn breeder, who it was known was in the market for an outstanding bull and well able to pay for him.

The full significance of this Short-horn opportunity at once became apparent. Stepping to the telephone, Mr. Harding accepted the bull and saved to Anoka Farms the profit, the honor and the glory of this matchless prize winner and sire of prize winners.

An opportunity lost to an individual but gained by the entire breeding fraternity was registered in 1907, a year that some of you may remember.

In that year the live-stock breeding world suddenly lost one of its biggest-hearted, most generous and enthusiastic members, Doctor Earles, of Milwaukee. At that time Earles & Stanton owned the bull Cumberland's Last and some twenty of the choicest matrons of the Short-horn breed, most of them safely settled to his service. In spite of my inclination and Stanton's persuasive pleadings, the outfit was passed up. This for a reason that might not appeal to any one dwelling in Kansas, but one of some force with me, viz., that in my inside pocket I did not have the few thousand ducats required.

The history of the show rings for the succeeding years has emphatically demonstrated some Short-horn possibilities I have missed, and which might, indeed, never have been written had I accepted this golden oportunity in Short-horn breeding. Congratulations are due all Short-horn breeders in general, and Charley Saunders in particular, for his foresight, courage and ability in taking this opportunity into camp.

In poetry and prose we have been told of the crimes committed in the name of Liberty. For generations past and in the days that now are,

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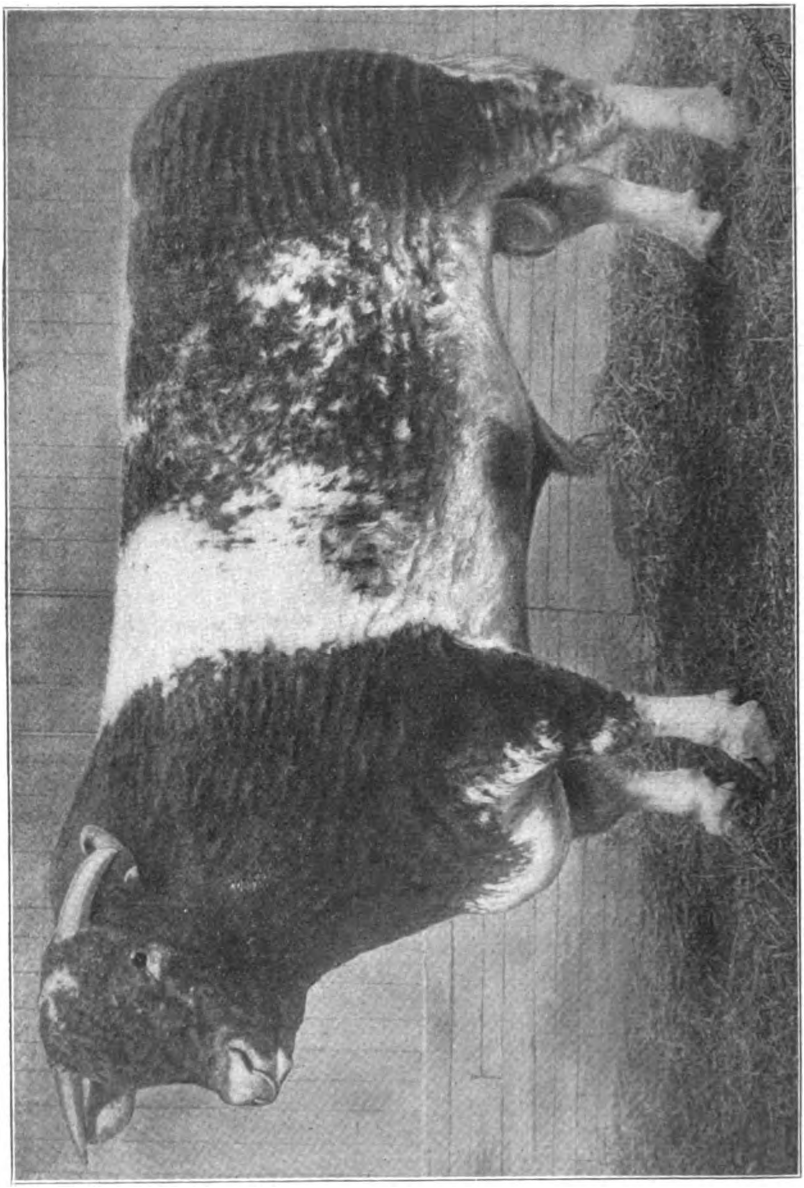

An ideal Short-horn sire.

what crimes are committed in the name of feeding and breeding live stock!

A ride over these half-snow-covered prairies in these opening days of the New Year would lead one to believe that some men to whom is given the ownership and care of live stock were satisfied that a balanced ration was made up of cornstalks, icicles, fresh air and exercise. When spring comes and the emaciated frames are doing their best to recover from the winter's ill treatment, and necessarily with poor success, the owner charges it all up to the breed of stock, and commits crime No. 2 by introducing some new breed into his herd.

The breed that meets our requirements and our fancy is the one to tie to. Having made this decision and started as nearly right as one's means and judgment permit, stay with it. Give it the best care, attention and development of which we are capable, learning from day to day those secrets of the art of feeding and care and the science of breeding. This course will lead somewhere, while indiscriminate and frequent changing or crossing of breeds leads nowhere.

Men who profess to be live-stock breeders are even more guilty. They should and do know better than to use a pedigree scrub simply because of its illustrious family name. They should and do know better than to ignore the essential and substantial in a meaningless struggle for fancy points. I yield to no one in admiration and appreciation of perfection of form, and even the niceties of breed character and type.

But what matters it if the ear of a Poland-China sow has the curve of a parabola or an ellipse, or the nose of a Berkshire tilts at 44½ degrees instead of 45. Men who profess to be live-stock men, breeders of live stock, and do these things, who fail to provide for the living wants of their stock, who depend on indiscriminate mixing of breeds to relieve their troubles, who look no further than the pedigree, and devote their time and attention to fancy points, lack even the candor of the darkey who arose in an experience meeting and announced: "Bredern and sisters, I's a right smart ornery nigger. I've played poker and I've shot craps. I've drank whisky and I've stole cheickens; but praise Gawd, I never yet lost my religion."

At the recent international show Mr. Geo. Lane, of Canada, offered $7000 for the grand champion Percheron stallion and was refused. Mr. Lane—an ex-Kansas ranchman, and now owner of 50,000 acres of deeded land and 100,000 acres leased land, and, so far as I know, the owner of the largest band of registered Percherons in the world, having in the neighborhood of 400 registered mares—looked around and discovered that the sire of this grand champion stallion had been imported into this country and was located in Indiana, and straightway bought the stallion that could produce an international grand champion—an opportunity overlooked by every Percheron breeder except Mr. Lane.

If you will pardon another personal experience—I recall a visit from a Berkshire breeder looking for a Berkshire boar. He wanted something good, and I turned him loose in a lot with three choice ones. My visitor spent some two hours viewing and reviewing the youngsters from every possible angle, and finally made a selection. He left, however, a pig of truer type—one which later developed into grand championship material and sold for more money than any hog I ever sold at public or private sale, save one.

My friend N. H. Gentry tells a similar story. Years ago a visitor came to his place looking for a boar. They finally narrowed the choice to one of two. Mr. Gentry, honestly giving his opinion and wishing to help his visitor in his selection, commented favorably on one of the boars. Quick as a flash the visitor, pointing to the other pig, said: "I'll take that one." The boar which was rejected became one of the founders of Berkshire excellence, the famous Longfellow.

Opportunities for securing the progenitor of an illustrious family in a breed of live stock is one of the dazzling features of the enterprise. Waiting, watching, working may disclose such opportunity and may not. In the great army of live-stock workers "he also serves who only stands and waits." So, whatever the direct results our work with live stock may be, one thing we quickly learn to recognize and prize beyond all else —the personal element; the associations and friendship, which are not merely incidental; they are inseparable from our work.

The work with live stock makes possible just such opportunities as these annual gatherings. It is the introduction to lovely homes and honest firesides; enlarges the acquaintance among big and brainy people who do things worth the while. And what is worth while? The man who produces a calf with the broad, level top line, instead of one fish-ribbed and having an elevated tail piece, has done something worth while. The man who produces the hog with the broad back and with the elevated tail setting has done something worth while. The man who feeds so as to produce two pounds a day where but one was made before, who so mixes his brain with his feed that two dollars produces as much as three did before, is an artist and is doing something worth while and that will compel recognition.

And here it may be stated that the development or acquirement of the feeder's art is one of the shining opportunities of breeding live stock. It is probably too general an observation to make to say that most good feeders are not constructive breeders. But in my limited observation I should say that most constructive breeders are good feeders.

From an economic point of view, the perennial opportunity for employment afforded by live stock must receive notice. The opportunity to keep employed and to give employment throughout the year means much for one's self, the community and the state. It all makes for a more efficient organization—no new set of men to drill and train with each recurring year; your experience becomes their practice, and the work moves with that machine-like precision which spells progress.

It has been charged to farmers more than to any other class of men that we do not recognize the value of time, exact time—we have all the season; at all events, all the day; it is all the same whether we begin a certain task this morning, or this afternoon, or to-morrow, or the day after to-morrow—that we do not keep proper account of our activities. Through this indefiniteness for beginning and ending our work we lose time, perhaps only an hour or two. Even so—

> "Lost: Yesterday, somewhere between sunrise and sunset, two golden hours, each set with sixty diamond minutes. No reward is offered, for they are lost forever."

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Short-horn cow, Spicy Beauty, owned in England.

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An hour or two or a month or two may be dropped into the irrecoverable past and lost without disastrous results to anyone. But is not the state's producing power immeasurably crippled and curtailed when any great proportion of its citizens drop out of producing activity for months at a time each year?

The farmer who embraces the opportunity afforded by live stock for year-round activity of himself, and so many of his men as he can profitably employ, is richer financially, healthier morally and physically and mentally, and the state is better off.

The live-stock opportunity is one that invites us to

"Do noble deeds, not dream them all day long,
And so make life, death and that vast forever
One grand, sweet song."

In my home state of Illinois there is a Pure-bred Sire Club. Anyone may become a member who pledges himself to use, wherever possible, a sire of pure breeding. The idea, with its germ of tremendous possibilities, is fairly infectious, and large numbers are being added to the membership daily. It marks an advance position taken and held in the campaign for improved live stock, and leads by a route both natural and attractive to those delightful planes of endeavor where pure-bred live stock, in all their attractive symmetry of form, claim our undivided attention.

If live stock affords additional opportunities to the farmer, and improved live stock greater opportunities through the organized use of pure-bred sires, then the logical sequence, the natural conclusion, is to seize the opportunity afforded by the breeding and raising of pure-bred live stock—not alone for our own satisfaction and profit, but for the welfare, the comfort and the profit of others as well as of ourselves.

"The wretch, concentered all in self,
Living, shall forfeit fair renown,
And, doubly dying, shall go down
To the vile dust from whence he sprung,
Unwept, unhonored and unsung."

The broad and general statement is ventured that no vocation so leads a man out of himself, so broadens his sympathies, so mellows his feeling for his fellow man as breeding pure-bred live stock; and no other peaceful vocation so fires his ambition and stimulates his courage.

In the recurring years we sow the grains in their season. In the live-stock department the opportunity for seeding is daily and hourly.

"Sow a thought, you reap an act;
Sow an act, you reap a habit;
Sow a habit, you reap a character;
Sow a character, you reap a destiny."

"And in the field of destiny we reap as we have sown."

There are doubtless many young men in this audience whose ambitions and aspirations are for preëminence in the noble professions of law and medicine. It may be, then, some young man's secret longing is to represent his district in the halls of the commonwealth. These are all commendable and laudable; but for me, I should esteem it a higher honor, an index of greater skill, to have produced an animal form so perfect in its outline, so true to breed type, so full of excellence and merit, that it would

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be accepted in public estimation as a preëminently worthy representative of its breed. Indeed, I would rather be the owner and breeder of an international grand champion than be the governor of the great commonwealth in which I have the honor and pleasure to reside.

The fact that a host of other live-stock breeders throughout the length and breadth of our land cherish a similar ambition to a like degree only enhances the honor, makes the delicate purple tints of the ribbon more radiant, more resplendent; for every glint and glimmer of its sheen speaks of satisfying toil and of obstacles overcome, of some approach to nature's truths, of some good work for man. It is the silent reminder of the transient thought of twilight, harvested ofttimes only in experience in the duties of the day. It is the inspiration of one successful act harvested from a heavy seeding of carefully cultivated endeavor. It is the bright and beaming harbinger of the fruition of coming years, remembering that "Duty and to-day are ours, results and futurity belong to God."

But the show ring is not only the court of last appeal upon a man's work; it is a sort of final verdict, a last analysis of the man himself. If there is in him envy, or selfishness, or bickering, then the show ring is the crucible to bring this dross to the surface. The show ring is a supreme opportunity to cultivate grace of spirit and of manner, generous impulse and mutual respect. Equal praise to the good loser and the modest winner—

"Who misses, or who wins the prize,
Go, lose or conquer as you can,
But if you fail, or if you rise,
Be each, pray God, a gentleman."

To be engaged in a business whose very foundation is honor, integrity and character, a business requiring every thought and care for its complete development, a business that thrives and flourishes in an atmosphere of generosity and kindly feeling and coöperation—does not this appeal to the heart and fire the imagination? A business that discounts Shakespeare's definition of opportunity; a business which believes there is more than one flood tide in the affairs of man as there is more than one flood tide in the waters of the ocean; a business that rejects the despair and desolation of one lost opportunity as defined by the incomparable Ingalls—but rather accepts that more hopeful, more joyous opportunity which proclaims:

"They do me wrong who say I come no more,
When once I called and fail to find you in;
For every day I stand outside your door
And bid you wake and rise to fight and win."

The clarion call of such an opportunity, with its cheer and its courage, invites every man of ambition and aspiration to its standard. This standard will lead you into action, and also it will lead into paths of pleasantness and into paths of peace. Van Dyke has set up some little guide posts on the foot-path to peace—a path always open and engaging to anyone interested in live stock:

"To be glad of life, because it gives you the chance to love and to work and to play and to look up at the stars; to be satisfied with your

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possessions, but not contented with yourself until you have made the best of them; to despise nothing in the world except falsehood and meanness, and to fear nothing except cowardice; to be governed by your admirations rather than by your disgusts; to covet nothing that is your neighbor's except his kindness of heart and gentleness of manners; to think soldom of your enemies, often of your friends, and every day of Christ; and to spend as much time as you can with body and spirit in God's out-of-doors."

FORAGE RATIONS FOR GROWING HORSES.

From Nebraska Experiment Station Bulletin No. 130, by W. P. SNYDER.

It was deemed advisable to conduct an experiment to determine the value of alfalfa pasture and alfalfa hay in keeping colts from weaning time until maturity. The plan was to keep one lot of colts on alfalfa hay in winter and on alfalfa pasture in summer; one lot on alfalfa hay in the winter and on prairie pasture in the summer; and one lot on prairie hay and cane hay in the winter and on prairie pasture in the summer. All colts were to get a uniform grain ration during the first winter.

In order to fulfill this plan 30 colts were purchased from W. A. Chamberlain on his ranch twenty miles southwest of North Platte. The dams were chiefly Montana mares ranging in weight from 900 to 1400 pounds. Six of the colts were mules, sired by a large jack. Two mules were put in each of the three lots. The mules cost $55 per head. Of the colts, 15 were geldings and 9 were mares. The geldings were valued at $45 per head and the mares $65. The entire cost of the 30 head was $1610. The sire of these colts was a pure-bred Percheron stallion that weighed 1800 pounds. To these were added a horse colt and a mule which were raised by the Station.

All colts ran together in an alfalfa field where there were alfalfa stacks from the time they were weaned, about October 1, 1907, until January 1, 1908, when they were divided into separate lots. During the weaning time and the remainder of the first winter they were fed 4 pounds of grain per head daily.

On January 1 and 2, 1908, weights were taken of each colt and the colts marked for future identification. The average weight of the colts in lot 1 was 588.5 pounds, of those in lot 2, 617.7 pounds, and of those in lot 3, 617.5 pounds. Lots 1 and 2 were kept together each winter and separated during each summer. Lots 2 and 3 ran together with other stock in a large canyon pasture in the summertime. The rations were as follows:

Lot 1, alfalfa hay in winter and alfalfa pasture in summer.

Lot 2, alfalfa hay in winter and prairie pasture in summer.

Lot 3, prairie hay and cane hay in winter and prairie pasture in summer.

The alfalfa pasture in which lot 1 ran contained 13 acres, with a field of prairie grass of about 10 acres adjoining it. The colts had the run of both fields.

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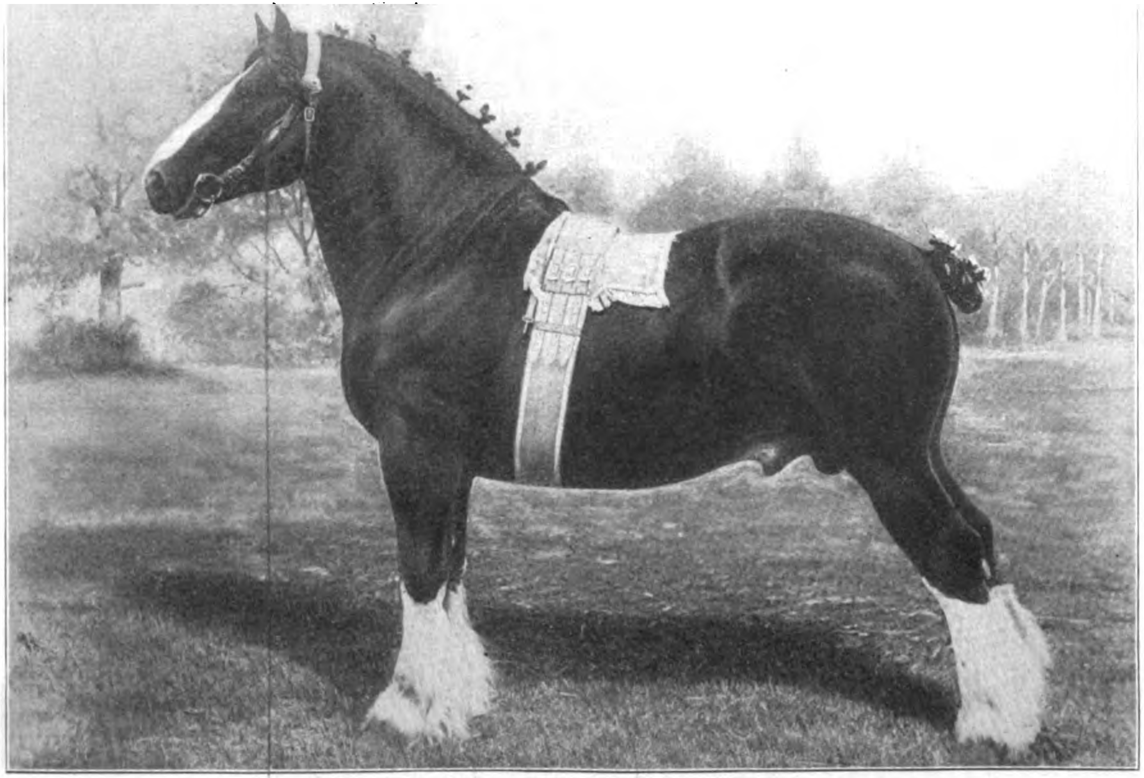

A specimen of compact Clydesdale.

The grain for all lots during the first winter was 4 pounds per head daily, consisting of two-thirds corn and one-third oats. This was varied somewhat during the first spring on account of sickness. None of the colts received grain regularly after the first winter, excepting lot 3, which received 3 pounds of emmer per head during the second winter. The colts were broken to the halter during the spring they were coming two years old. A very little grain was fed at that time. During the summer that they were three years old they were broken and worked. Grain was fed while they were at work. This has not been considered in the cost of growing them, as the labor performed by the colts fully paid for the grain and hay eaten.

During the first week in March, 1908, when the colts were not yet a year old, a very severe form of distemper attacked the colts in lots 1 and 2. They had an open shed as protection against storms. Several of the colts required the services of a veterinarian. Three colts died. This reduced the number to 29. The colts in lot 3 were about thirty rods distant from lots 1 and 2. They were vaccinated soon after lots 1 and 2 became infected. About the first of April the colts in lot 3 became infected, but they did not have a very severe attack, though all were quite sick. Their having the distemper less severely than the colts in lots 1 and 2 may have been due to the effect of the vaccine, or to the weather conditions, or to both. The colts in lots 1 and 2 especially became very thin while affected by the distemper. About May 1 the mares were separated from the male colts, and the former turned on the alfalfa and the latter into the canyon pasture, and the other colts into the alfalfa pasture. They ran this way until June 23. The spring weights were taken June 15, as the effect of the distemper had not permitted fair weights previous to that date. The male colts were castrated June 18. There was nothing to change the plans or vitiate the results after the first winter.

The individuality of the colts varied greatly, as is indicated by the weights and the gains made. The distemper affected some colts much more than others, but the results of this had likely been overcome before the final weights were taken, January 14, 1911. Some colts were worked more than others, but the work performed by each of the three lots was about the same. There was an attempt made to bring all colts to a similar condition of flesh before the final weight was taken. Though all were in good flesh at this time, some colts were much fleshier than others. Lot 1 had the advantage in this respect.

The prices assumed for feed are as follows:

Corn, per bushel	$0 50
Oats, per bushel	35
Emmer, per bushel	30
Alfalfa, per ton	6 00
Prairie hay, per ton	5 00
Cane hay, per ton	4 00

The pasture for the colts is calculated as follows: The colts that ran on alfalfa ate the alfalfa off about one acre per head. This would have easily cut 3½ tons per acre. This at $6 per ton would amount to $21 per acre. Allowing one-half for cutting, the colts should be charged $10.50 per head for the summer. We feel that this is a rather conserva-

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tive charge, as the estimate on the yield is conservative, and also the colts pastured the alfalfa in spots and killed some. They liked the young, tender alfalfa, and when they had a place pastured short they continued to pasture on that place rather than where the alfalfa was higher and older.

The colts that ran on native grass pasture are charged 6 per cent interest on 8 acres of land valued at $8 per acre, plus a slight charge of 25 cents per head for water. If the pasture season were 6 months, this charge would be at the rate of 68 cents per month.

TABLE 1. *Winter, summer, yearly and total average gains of colts on forage experiment, in pounds per head.*

January 1, 1908, to January 14, 1911.

LOT.	First winter. Jan. 1, '08-June 15, '08.	First summer. June 15, '08-Oct. 31, '08.	Second winter. Oct. 31, '08-Apr. 21, '09.	Second summer. Apr. 21, '09-Nov. 2, '09.	Third winter. Nov. 2, '09-Mar. 18, '10.	Third summer. Mar. 18, '10-Dec. 1, '10.	Fourth winter. Dec. 1, '10-Jan. 14, '11.
1	152.5	244.5	5.5	181.5	20.6 L*	39.7	77.3
2	142.2	93.8	95.0	107.7	22.6	120.7	41.6
3	99.5	113.5	4.5	191.0	64.8 L*	133.3	63.0
Av..	131.4	150.6	35.0	160.1	20.9 L*	97.7	60.6

LOT.	First year. Jan. 1, '08-Oct. 31, 08.	Second year. Oct. 31, '08-Nov. 2, '09.	Third year. Nov. 2, '09-Dec. 1, '10.	Fourth year. Dec. 1, '10-Jan. 14, '11.	Total gain. Jan. 1, '08-Jan. 14, '11.
1	397.0	187.0	19.1	77.3	679.9
2..........	236.0	201.7	143.3	41.6	610.6
3..........	213.0	195.5	68.5	63.0	540.0
Av........	282.0	161.7	76.9	60.6	610.1

* "L" indicates loss.

The colts fed alfalfa hay (lots 1 and 2) gained about 50 per cent more during the first winter than those fed prairie hay and cane hay (lot 3). During the first summer the colts which ran in an alfalfa pasture (lot 1) gained more than twice as much as those which ran in a native grass pasture (lots 2 and 3). The colts which were wintered on alfalfa hay (lot 2) did not make as much gain during the following summer, when in a native grass pasture, as the colts which were wintered on prairie hay and cane hay and ran in a native grass pasture during the summer. The relative gains during the first year for the three lots were as follows:

During the first winter: Lot 1, 100; lot 2, 93; lot 3, 65.

During the first summer: Lot 1, 100; lot 2, 38; lot 3, 46.

During the first year: Lot 1, 100; lot 2, 59; lot 3, 54.

This shows that during the first year the colts which had access to alfalfa all the time gained nearly twice as much as those having alfalfa during the winter only, or those having no alfalfa.

This difference in gains does not continue throughout the following years. By the end of the first year the colts in lot 1 had a maximum

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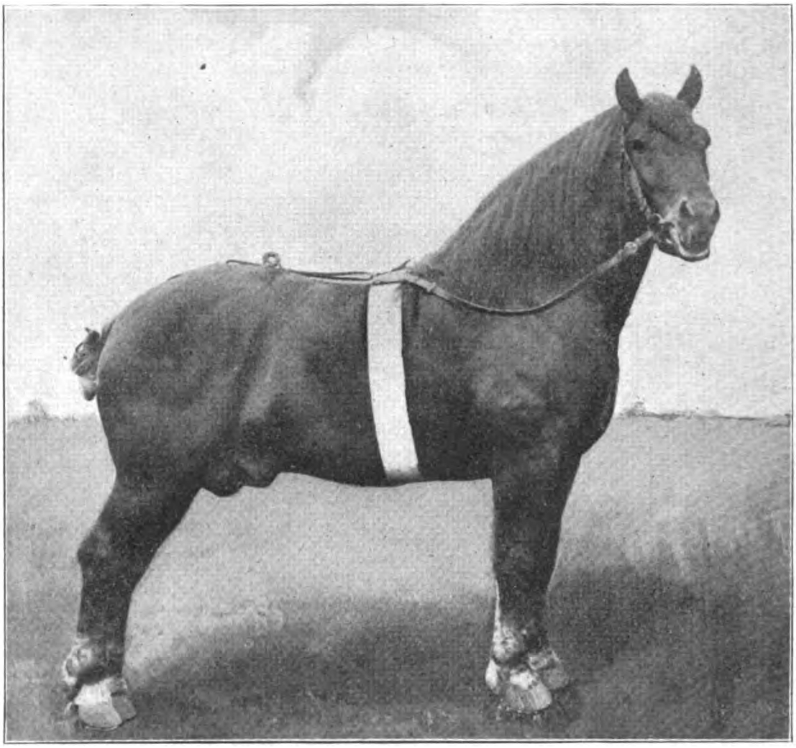
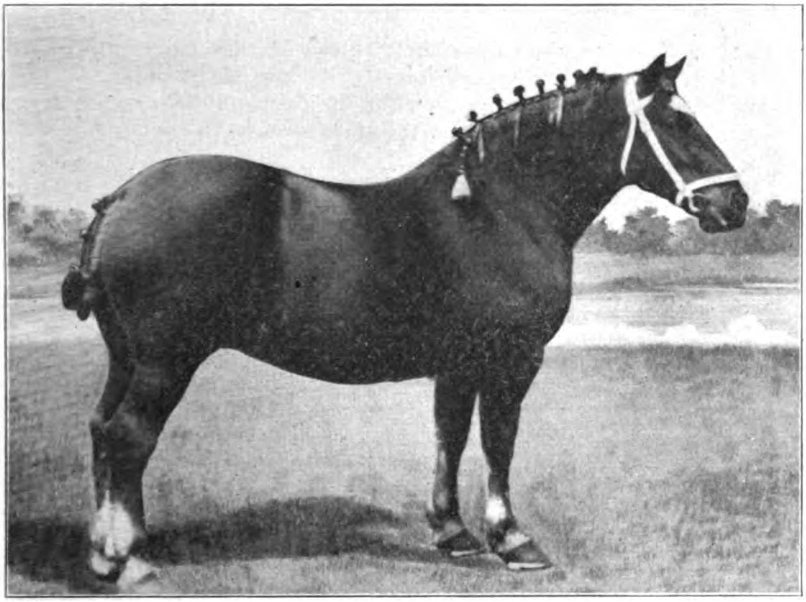
amount of flesh and fat on their frames. The extra gain above that of the other lots was largely extra flesh and fat. From that time on the extra gain was of necessity largely frame as well as flesh. The gain of lot 1 over lots 2 and 3 was greater at the end of the first year than at the end of the third year.



Sproughton Gold Ring (3347) 536, a magnificent specimen of the Suffolk breed. Weight, 2125 pounds.

During the second winter the colts that had alfalfa during the summer (lot 1) made very little gain, or about the same gain as those having native grass in the summer and prairie hay, cane hay and grain in the winter (lot 3), while those which had native grass in the summer and alfalfa hay in the winter (lot 2) gained 95 pounds each. During the second summer the gain on lot 1 while on alfalfa pasture was less than on lot 3, which was on native grass pasture but had been wintered without alfalfa. The gain on lot 2 was much less than on either of the other lots. The gain of the second year was fairly uniform for the three lots, with lot 2 the highest and lot 3 second.

During the third winter there was a loss of 64 pounds per head on the colts that did not get alfalfa (lot 3), a loss of 20 pounds per head on those having alfalfa throughout the year (lot 1), and a gain of 22 pounds per head on the colts fed alfalfa during the winter only (lot 2). The record of the third summer, when all lots were treated alike, shows very much less gain on the colts accustomed to alfalfa throughout the year than on the other colts. During the third year the colts in lot 2 made very much larger gains than the colts in either of the other lots.



Sudbourne Ruby (5805) 418, champion Suffolk mare over all ages at the International Show, Chicago, in 1911.

The total gain per head from January 1, 1908, to January 14, 1911, of the colts given alfalfa hay in the winter and alfalfa pasture during the summer (lot 1) was 679 pounds; of those given alfalfa hay in the winter and native grass pasture in the summer (lot 2), 610 pounds; and of those given prairie hay and cane hay in the winter and native grass pasture in the summer (lot 3), 540 pounds. Or the relative gains were, lot 1, 100; lot 2, 90; and lot 3, 80. Lot 1 gained 70 pounds per head more than lot 2, and 140 pounds more than lot 3. Lot 2 gained 70 pounds more per head than lot 3. A close study of the gains made indicates that the chief value of the alfalfa, or at least of the alfalfa pasture, came during the first year.

The increase in weight during the first winter for each lot was much greater than during the second winter or the third winter. This may have been due, in part, to the influence of the grain fed during the first winter so far as lots 1 and 2 are concerned, but there was a similar decrease in the gain of lot 3, while the feed was almost the same during both winters. The duration of the two winter periods was not the same, but this dissimilarity would not make much difference in the gains. It would seem, therefore, that the increase in weight of colts during the first winter is greater than during the second winter, when conditions

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are similar. A like result will be noted between the second and third winters. There was some gain on all lots during the second winter, but a loss on two lots during the third winter. We find that the gains made by steers during the first three winters is quite similar to the gains made by these colts. The average daily gain for the first three winters for all colts was as follows: First winter, .79 pound; second winter, .02 pound; third winter, loss .46 pound; or the average daily gain for the first three winters was approximately .37 pound. Similar data for steers show the average daily gain for the first winter to be .64 pound, the second winter .50 pound, and the third winter .10 pound, or for the three winters .41 pound.

The average daily gain for the first summer was greater than for the second summer, and for the first year greater than for the second year. The gain during the third year was the least of any year. These results indicate that the summer, winter, and yearly gains decrease from the first to the second season or year, and from the second to the third season or year.

TABLE 2. *Cost* of feed per colt.*

Lot.	First winter.†	Second winter.	Third winter.	Fourth winter.‡
1	$10 17	$12 28	$12 93	$4 83
2	10 17	12 28	12 93	4 83
3	9 12	11 15	8 81	4 83
Average	$9 82	$11 90	$11 55	$4 83

Lot.	First summer.	Second summer.	Third summer.	Entire experiment.
1	$10 50	$10 50	$4 09	$65 30
2	4 09	4 09	4 09	52 48
3	4 09	4 09	4 09	45 48
Average	$6 23	$6 23	$4 09	$54 42

* For prices of feed see page 220.
† For duration of seasons see table 1.
‡ A short period.

The average cost of feed per head for wintering the colts in the three lots was, for the first winter $9.82, the second winter $11.90, and the third winter $11.55. The average gain per head was, for the first winter 131 pounds, the second winter 35 pounds, and a loss of 21 pounds per head during the third winter. This shows that the cost of gains was much greater during the second winter than during the first, and also much greater during the third winter than during the second. A study of the tables indicates that this higher cost of gains as the age advanced was due to the age and size, rather than to any difference in the feed. Lot 3 was fed nearly the same during the first and the second winters, yet the average gain per colt during the first winter was 99.5 pounds, or .6 pound daily; and during the second winter the gain was 4.5 pounds, or at the rate of .002 pound per day. Lot 2 was given the same feed during the second winter as during the third winter, yet the average gain per head during the second winter was 95 pounds, or .55 pound daily; and during the third winter the average gain per head was 22.6 pounds, or at the rate of .16 pound daily.

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TABLE 3. ***Record of three lots of colts fed differently during winter and summer, from weaning time until three-year-olds.***

January 1, 1908, to January 14, 1911.

Lot No.	1.	2.	3.
Forage ration, winter	**Alfalfa.**	**Alfalfa.**	**Prairie hay, cane hay.**
Pasture ration, summer	**Alfalfa.**	**Native grass.**	**Native grass.**
No. in lot	10	9	10
Average first weight, January 1, 1908,	588.5	617.7	617.7
Average last weight, January 14, 1911,	1,268.4	1,228.3	1,157.5
Average gain, lbs.	677.9	610.6	540.0
Average daily gain, lbs.	.61	.55	.48
Relative gain	100	90	80
Tons forage eaten per colt	5.30	5.30	4.65
Cost of feed grain*	$8 41	$8 41	$12 28
Cost of feed forage	31 80	31 80	20 93
Cost of feed pasture	25 09	12 27	12 27
Total cost of feed per colt	65 30	52 48	45 48
Average purchase price	57 00	53 70	52 00
Int. at 6 per cent on purchase price	10 38	9 78	9 47
Total cost per colt January 14, 1911,	$132 68	$115 96	$106 95

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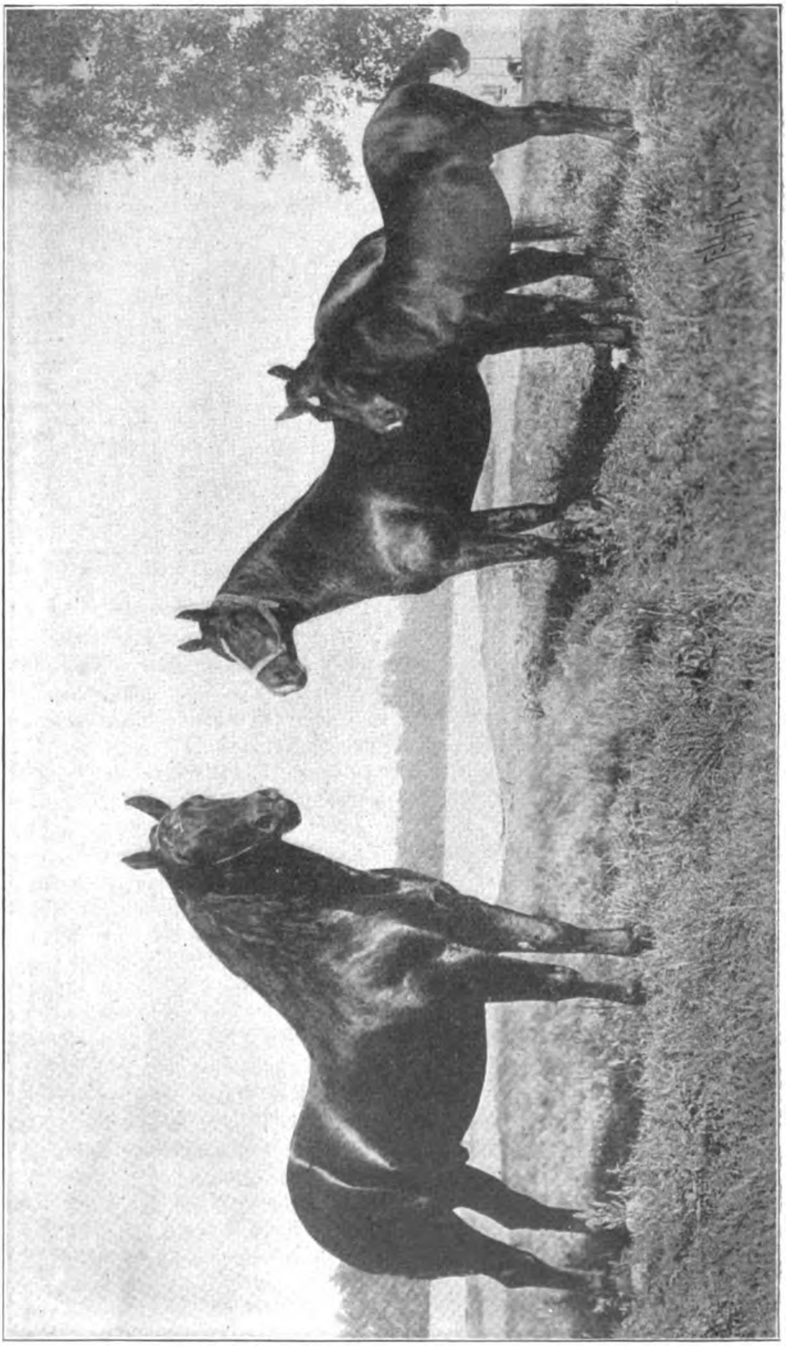
* All colts were fed grain during the first winter. Lot 3 was fed grain during the second winter also.

The increase in weight of lot 1 over lot 3 was largely flesh. The colts in lot 1 were always fat after the first winter. A similar comparison is true regarding lot 1 and lot 2. That is, there was enough more flesh on the colts in lot 1 to account, to a large extent, for the gain made by that lot in excess of the gain made by the other lots. The increase was largely flesh and fat rather than bone. It seems quite probable that all lots would reach about the same weights if given similar conditions for another year. If it be true that the difference in weights represents largely a difference in condition, it seems probable that the extra weight on lot 1 came at too great a cost. The difference in the gain between lot 1 and lot 2 was only 70 pounds per head, and the difference in the cost of feed was $12.82. It seems proper, from the data obtained in this experiment, to conclude that it was not profitable to pasture these colts on alfalfa. On the other hand, if the colts had been sold during the progress of the experiment it is quite probable that those in lot 1 would have sold for enough more than the others to have paid the additional cost and to have left a net credit above that of the other colts. They were always in heavy flesh and commanded much attention. It is also worthy of notice that these colts held their flesh remarkably well while at work, and stood the work exceptionally well.

Lot 1 gained 140 pounds more than lot 3, at a cost for feed of $19.82 more per head. This extra gain may or may not have been profitable. The gain was largely flesh and fat, though it was in part due to development of frame.



Percheron champions at the International Show.

Lot 2 gained 70 pounds more per head than lot 3, at a cost for feed of $7 more per head. There was some difference in the condition of flesh. We believe that this extra gain was profitable.

CONCLUSIONS.

The conclusions that we feel justified in drawing from the result of this experiment are:

1. It was not profitable to pasture the alfalfa during the summer, or at least after the first summer.
2. It was profitable to feed alfalfa hay during the winter.
3. It might have been profitable to pasture the alfalfa during the summer if the colts had been sold as yearlings or two-year-olds.
4. It may be profitable to pasture alfalfa with colts where there is some special incentive for getting rapid gains or where the cost of alfalfa pasture and of native grass pasture are about equal.
5. Alfalfa pasture put the colts in an excellent condition of flesh and finish and produced no injurious effects.
6. The flesh put on these colts is in no sense "flabby" or temporary; it seems to be solid flesh that endures work.
7. Alfalfa hay produces more increase in weight on colts than prairie hay and cane hay during the winter.
8. Colts make a greater gain during the first winter and during the first summer after weaning than during any winter or summer following, and also make greater gains during the second winter and second summer than during the third winter and third summer, when conditions are similar to those in this experiment.
9. Colts put on pasture when thin in flesh make faster gains than similar colts put on pasture when in good flesh.
10. The increase in weight on the colts in this experiment cost less during the first winter than during the second, and less during the second winter than during the third.

FINANCIAL STATEMENT.

To 30 colts, at $53.32	$1,610 00	
To 2 colts, at $75	150 00	
To feed for 32 colts	1,580 12	
To interest on purchase price, at 6 per cent	286 50	
To profit on colts	793 38	
By 29 colts, at $152.41	....	$4,420 00
	$4,420 00	$4,420 00

Profit per colt, $27.46.

In this financial statement the colts are charged with their purchase price and 6 per cent interest on this. They are also charged market prices for all pasture, forage and grain eaten. They are also made to pay for all loss, which represents risk on the investment. This risk was not small. It consisted of 3 colts dying the first spring and the value of the others being reduced $200 because of blemishes. After paying all these items of expense, the 29 colts returned a net profit of $793.38, or $27.46 per head.

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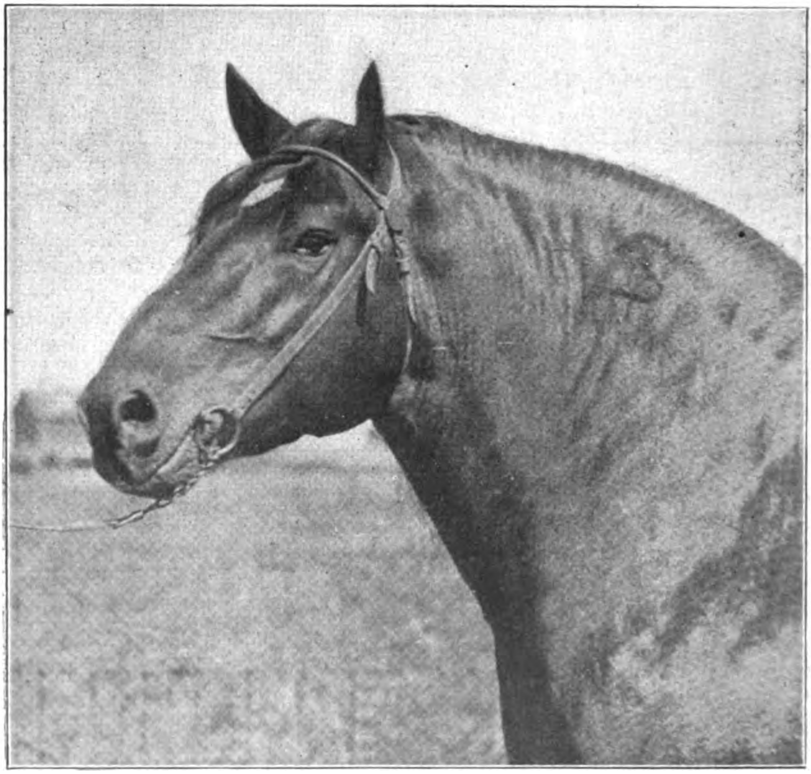
TABLE 4. ***Total individual gain of colts on forage experiment.***
January 1, 1908, to January 14, 1911.

Lot 1, alfalfa hay in winter and alfalfa pasture in summer.

		First weight.	Last weight.	Gain.
5		605	1,420	815
10		590	1,260	670
13		625	1,222	597
19		590	1,315	725
23*		475	992	517
24		725	1,465	740
25		660	1,360	700
27		645	1,370	725
28*		375	935	560
31		595	1,345	750
10	Total	5,885	12,684	6,799
	Average	588.5	1,268.4	679.9



A champion Percheron sire at the International Show, Chicago.

Lot 2, alfalfa hay in winter and native grass pasture in summer.

	First weight.	Last weight.	Gain.
1	575	1,107	532
6*	595	1,230	635
7	650	1,410	760
9	700	1,338	638
11*	520	1,045	525
15	775	1,355	580
18*	420	960	540
29	685	1,370	685
30	640	1,240	600
9 Total	5,560	11,055	5,495
Average	617.7	1,228.2	610.5

Lot 3, prairie hay and cane hay in winter and native grass pasture in summer.

	First weight.	Last weight.	Gain.
2	660	1,290	630
3	660	1,172	512
4	615	1,172	557
8*	425	882	457
12	685	1,230	545
14	685	1,277	592
17	610	1,070	460
20	680	1,275	595
22	700	1,277	577
26*	455	930	475
10 Total	6,175	10,402	5,400
Average	617.5	1,040.2	540

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* Mule.

PERCHERON BREEDING IN KANSAS.

By Wayne Dinsmore, Secretary Percheron Society of America, Chicago.

Draft-horse breeding is centered in the six big corn belt states, Ohio, Indiana, Illinois, Iowa, Nebraska and Kansas. These are likewise the leading Percheron states, contributing more than 72 per cent of the Percherons bred in America.

Kansas stands fourth in total number and value of horses. She also occupies fourth place in pure-bred Percherons. The last census credits the state with 1,147,056 horses, valued at $112,758,108. Figures recently compiled by the Percheron Society of America show that 10,758 American-bred Percherons were recorded between August 1, 1910, and May 1, 1912. Of these 627 were bred in Kansas, and the state contributed 5.8 per cent of all recorded in the time mentioned.

The accompanying map shows at a glance the distribution of Percherons in the state by counties. It also shows the percentage each county contributed to the total for the state, and the number of members of the Percheron Society of America. Butler, Harvey, Mitchell, Barton, Cowley, Sumner and Phillips are the first seven counties, ranking in the order named. Together they contributed 38.4 per cent of all those bred in the state.

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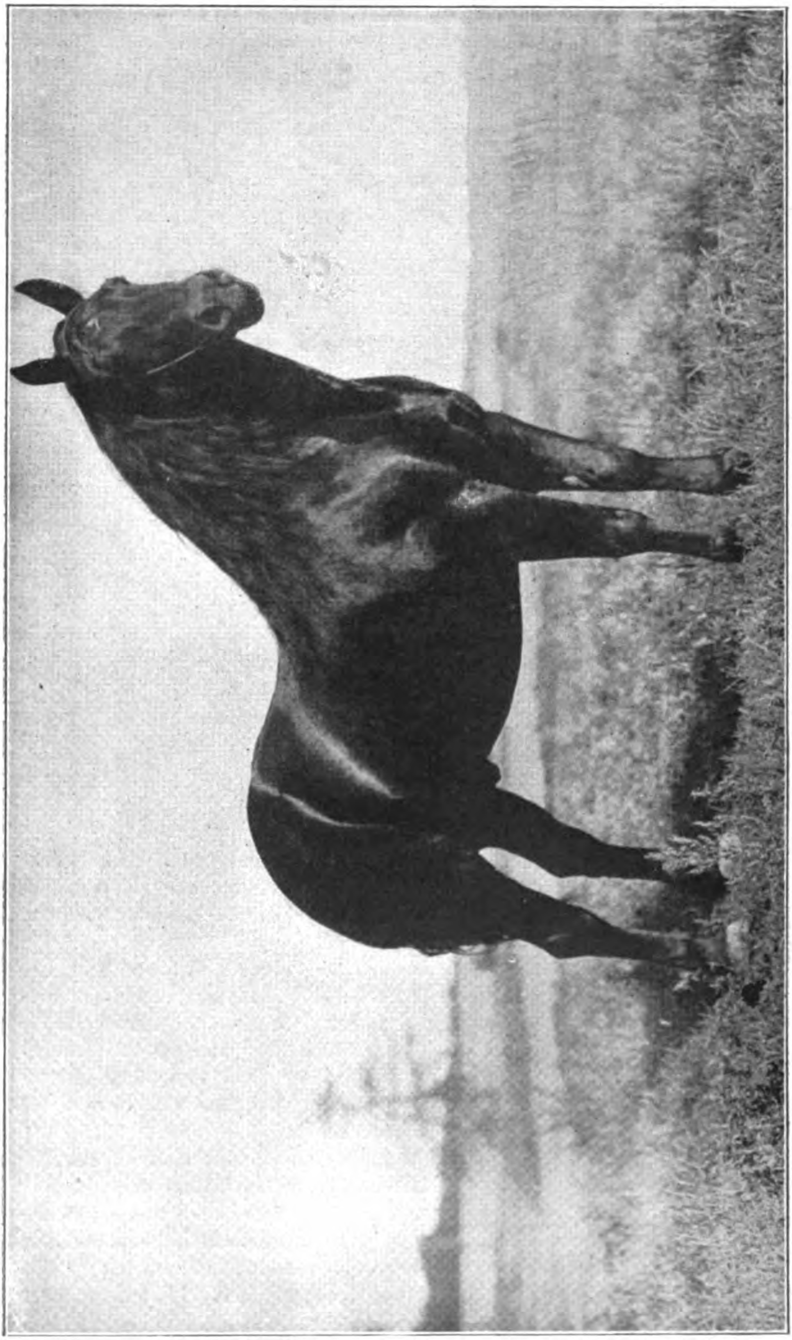
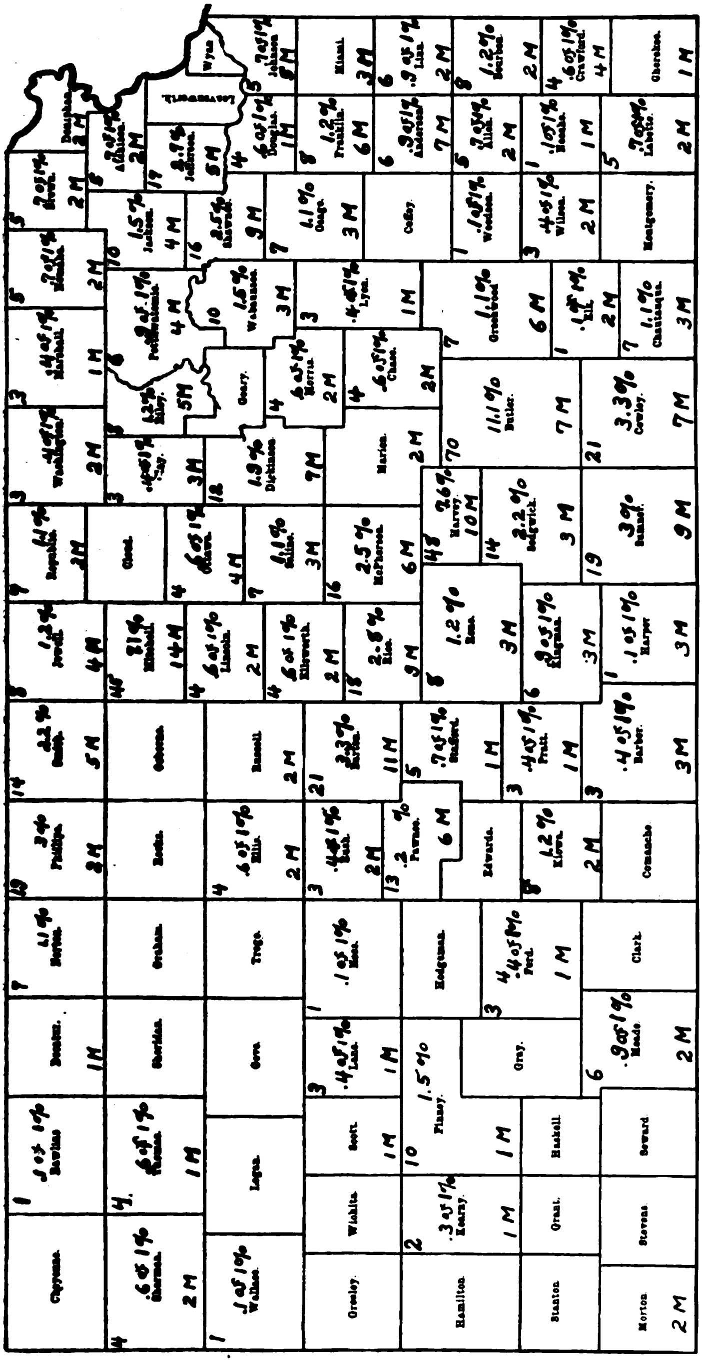


A noble Percheron.



Map showing the distribution of Percherons in Kansas, per cent of total number bred in each county and recorded between August 1, 1910, and May 1, 1912. M indicates members of the Percheron Society of America.

It will be noticed that the distribution is very considerable, as Percherons are being bred in 72 out of the 105 counties, and no one county has any marked advantage over others, although the first two counties, Butler and Harvey, together contributed a little over 18 per cent of those bred in the state. These first seven counties constitute three separate groups: one in the south-central part of the state, one in the central part, and one in the north-central part of the state. Mitchell county enjoys the honor of having the greatest number of breeders; also the distinction of having the strongest county breeders' association in the state. This has been in existence for some three years, and has already accomplished a great deal, particularly in encouraging farmers throughout the county to purchase excellent individuals of pure breeding.

The breeding of Percherons in Kansas has been carried on for about thirty years. The first authentic importations were made prior to 1876, by M. J. Parrott, of Leavenworth, Kan., who imported two head. Henry Avery, of Wakefield, purchased Zama 1368 in 1883, and Wm. Dengel, of Salina, took Vidou 953 to the state in 1881.

There were other scattering purchases within the next few years. J. W. & J. C. Robison, of Towanda, took a number to the state in 1885. This stud has been maintained to the present, and is now one of the noted breeding establishments of the United States.

The general distribution of Percherons in Kansas may be said to have begun about 1885, and breed interests have grown steadily since that time. Their popularity in Kansas is attested by the fact that out of 2387 pure-bred draft stallions standing for service in the state in 1911, 1733, or 72 per cent, were Percherons. This appears to be a higher proportion of Percherons than is found in any other state. These figures were supplied by C. W. McCampbell, of the Kansas State Stallion Board.

Comparison of the total number of horses with the total number of pure-bred draft stallions reveals that there is but one pure-bred draft stallion per 480 horses. This means only about four sires per 2000 horses. Experienced horsemen know that this is not half as many as are needed to permit every farmer to have ready access to a good sire. The need for additional pure-bred horses of the right kind is manifest. The opportunity is before Kansas Percheron breeders.

Strong county breeders' organizations are to be recommended, and will stimulate the production of more and better draft horses. The first step in this is to establish a good market for the horses produced in that particular locality, by advertising and drawing buyers to the county. A broad-minded policy must prevail, and the aim should be to benefit all draft-horse breeders, whether they are handling pure-bred horses or not. The farmer who is raising grade draft horses is encouraged to produce better ones if a good market is afforded for those he has produced. Buyers for city markets will readily go to any locality to purchase sound, well-proportioned geldings that will weigh 1650 pounds or over at four years of age. Buyers for the Southern states and for the West and Northwest will take all the surplus mares of this kind at good prices.

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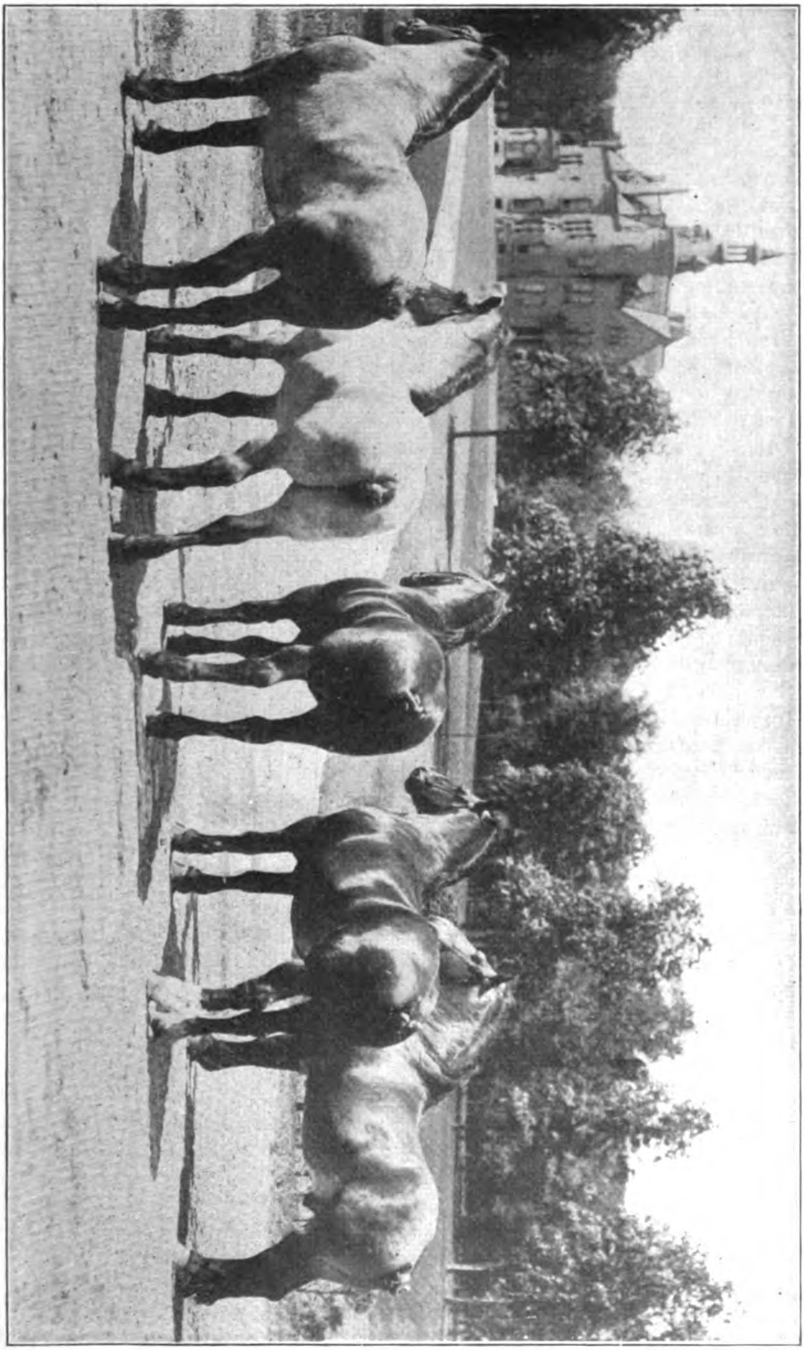

A group of handsome Percherons

The character of Percherons produced in the county can be improved by the work of such local organizations. Colt shows can be started, and these encourage small breeders to take better care of their young stock, which is a most important point. In the judgment of a large proportion of the most experienced horsemen, 90 per cent of our Percheron breeders do not feed their colts, yearlings and two-year-olds liberally enough. Pure-bred draft colts should have a creep where they can secure good oats, or a mixture of corn, bran and oats, whenever they want it. The local organization, through colt shows, can demonstrate the necessity of extra liberal feeding and the profit accruing thereby. Scrub stallions are automatically eliminated. The inferiority of their produce, manifest when brought into deadly parallel with the product of first-class pure-bred sires, brings an abrupt end to their career.

These and other practical measures of improvement can be wrought out by a strong county horse breeders' association. Annual dues of $5 or $10 from each member will permit the local association to compile and publish a booklet giving a list of all pure-bred draft horse breeders in the county, with a statement as to the number of pure-bred horses owned by each, and what surplus there is available for sale. It will also provide for a small, clean-cut advertisement in one or two of the leading agricultural papers covering the territory in which sales are sought. Inquiries resulting from such advertising can be answered by the local secretary, briefly but clearly, by means of printed information which he should have available to mail out to such prospects. By united work along these lines small breeders can secure, at slight cost, publicity of the right kind, which will give greatly increased opportunities for selling surplus colts at good prices.

In production, breeding and feeding are the two essentials. Good foundation stock, possessing size, draft conformation and soundness, is the first requisite; but such foundation stock avails nothing unless the animals produced are given a full opportunity, through extra liberal feeding, to develop. The value of the oat bin cross is more fully understood in France than in America. The aim needs to be, in growing pure-bred draft colts, "not how cheap, but how good." Efficient production simplifies distribution. Buyers once attracted to a locality by proper advertising will never forget the district if they find first-class horses.

Kansas has as great opportunities for the breeding of good Percherons as any state in the Union, and many good judges consider that the combination of corn, oats, alfalfa, abundant water and rolling land gives the state an advantage over any other district of the same size in the United States. Certain it is, that at the present day there is probably no state where so large a proportion of the draft horses are of Percheron breeding. The Agricultural College has given special attention to the breed, and the breeders are fortunate in having the protection of the soundest stallion law enacted in any state. Selection and purchase of good foundation stock is relatively easy; soil and climatic conditions are most favorable; attention to essential points and production and united work in marketing the surplus stock will enable the state to hold its present strong position in Percheron breeding, and it may in time attain an even higher rank than it now holds.

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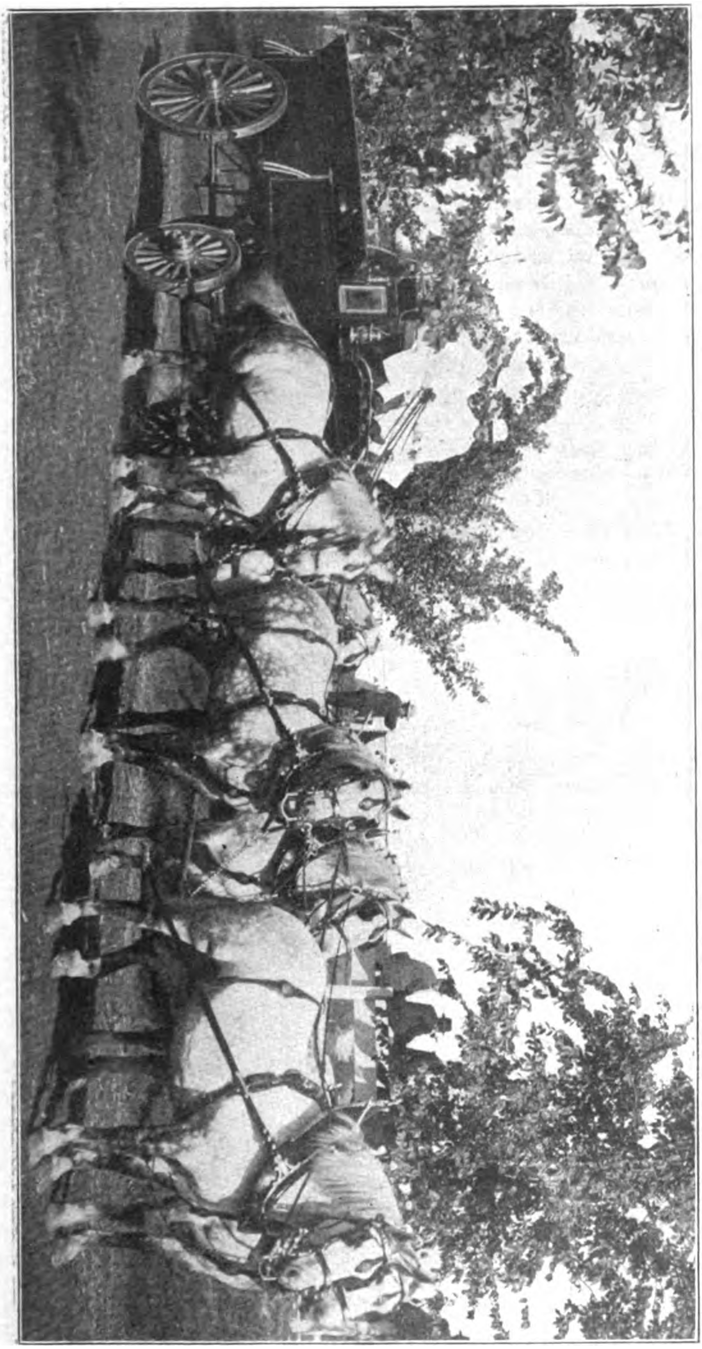

A hitch-up of Percherons owned by Swift & Company.

ECONOMICAL BEEF PRODUCTION.

From Nebraska Experiment Station Bulletin No. 116.

INTRODUCTORY.

While beef has been high in price during recent years, the price of corn has so increased that the production of beef offers the farmer no greater financial inducements than formerly. Notwithstanding this increase, there is still no farm grain, in the corn belt at least, that can be had at a lower figure per hundred pounds, and there is none more serviceable for fattening purposes. Stock feeders will therefore continue to make this grain their chief dependence, but in the future, assuming that the price of corn remains high, as it is likely to do owing to the limited area of its cultivation and its increased use for purposes of human consumption, it will be necessary to so combine it with other foods that the ration as a whole will more nearly meet the physiological requirements of the animal, and beef will be produced on less feed and at a lower cost. The problem is therefore one of supplementing corn to the best advantage. Cattle are needed on our farms to utilize cheap roughage and to assist in conserving fertility. It is an industry which should be encouraged, for the benefit not only of the farmer but of the consumer as well, and we should strive to learn ways by which beef can be produced at a lower cost, which can undoubtedly be accomplished after making a more careful study of rations and the individuality of the animal.

PART I.—THE PROBLEMS AND EXPERIMENTS.

In bulletin 100, entitled "Economical Rations in Beef Production," published in 1908, a report was given of an experiment carried on during three successive years, in which the ration corn and prairie hay was compared with corn and alfalfa, and also with corn, linseed meal, and prairie hay. The results each year showed very conclusively the importance of using with corn either a protein roughage such as alfalfa, or a protein concentrate, of which linseed meal is an example. The average of three experiments showed that 36 per cent more grain was required to produce a given gain, and at a correspondingly higher cost, with prairie hay than with alfalfa, when the grain ration consisted of corn alone. In the comparison of corn, prairie hay and linseed meal fed in small quantity, and corn and prairie hay without such a protein supplement, the average of three experiments showed that 31 per cent more grain was required for a given gain without this meal than with it, and the cost of producing gains was 12 per cent greater without the linseed meal, for which an average price of $28.33 per ton was paid. From these observations it would seem that large gains can be made on corn and alfalfa and at low cost without any so-called protein concentrate. Experiments made in other states show that corn and clover hay are also very satisfactory for fattening cattle, which we might expect, because the latter belongs to the same family to which alfalfa belongs. Very likely either legume contains enough protein to supply the deficiency of that nutrient in corn for fat-

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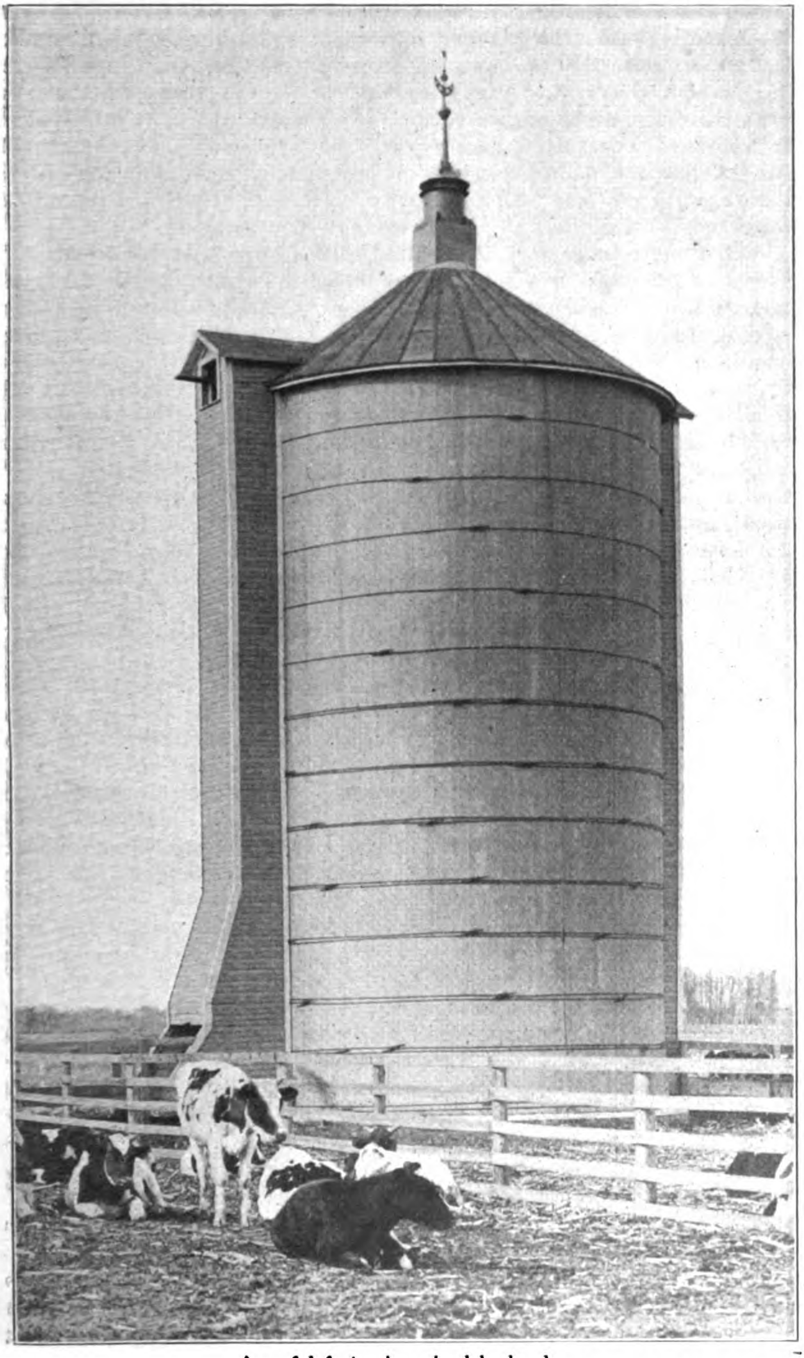

A useful factor in animal husbandry.

tening cattle, though alfalfa contains somewhat more than clover. With the exclusive use of any other roughage, except cowpea hay, another legume, it seems that we must supply additional protein, which may be purchased in the form of some by-product put on the market for that purpose, the choice depending on relative efficiency as well as relative prices. In Nebraska, wheat bran, linseed meal, and cottonseed meal are available for this purpose, and it was thought advisable to make a comparison of these concentrates one with another, and each with alfalfa fed as half the roughage, in which case no protein concentrate was used.

While but a small part of the fifty million bushels of wheat annually grown in this state is manufactured into flour within our borders, still there is a large tonnage of bran produced. Linseed meal (oil meal), the residue from the extraction of linseed oil from flaxseed, is made in large quantities in the more northern states, and because of its richness in protein and its high commercial value it can be shipped in with but relatively small additional cost per ton. For the same reason cottonseed meal, a residue from the manufacture of cottonseed oil from the seed of cotton, can be shipped from the South to compete on middle ground with linseed meal from the North. Gluten feed, a by-product in the manufacture of starch and glucose from corn, is prepared in states farther east, where the demand for it among farmers is such as to make the price too high to compete here with the other products mentioned after transportation charges have been added. Alfalfa can be grown on nearly every farm in Nebraska, and may be used satisfactorily as a protein supplement to corn either by itself or with some other roughage.

In the table opposite are shown results of two experiments in which four groups of steers, with ten in a group, were fed on as many rations, each of which contained one of the four protein foods mentioned as being available in this state. In the first, corn and prairie hay formed the basis of each ration; and in the second, corn and unshredded corn stover, both of which, like corn, are deficient in protein. Two-year-old grade Shorthorn and Hereford steers from a ranch in Rock county, Nebraska, were used in the first experiment, and two-year-old grade Angus from Sioux county, Nebraska, in the second.

Table I shows that in both experiments the smallest daily gains were made with bran, a larger quantity of which was used than of either linseed or cottonseed meal because of its greater bulk and lower protein content. Cottonseed meal was next lowest in both experiments. The highest average daily gains were made with linseed meal the first year, and the highest with alfalfa the second year, the average for both being slightly in favor of linseed meal. In cost of gains and profits, the alfalfa had much the advantage. In the first experiment, corn cost 35 cents per bushel, bran $15 per ton, linseed and cottonseed meal each $32, and alfalfa and prairie hay each $6 per ton. In the second experiment, corn cost 36 cents per bushel, bran $18 per ton, linseed meal $29.50, cottonseed meal $27.75, alfalfa $6, and corn stover (stalks) $2.50. The low cost of alfalfa for roughage possessing such a high nutritive value, especially for the protein it contains, readily explains the advantage in its favor for combining with corn in beef production. In both experiments it returned a value of approximately $13 per ton in comparison with linseed meal at $30 per ton.

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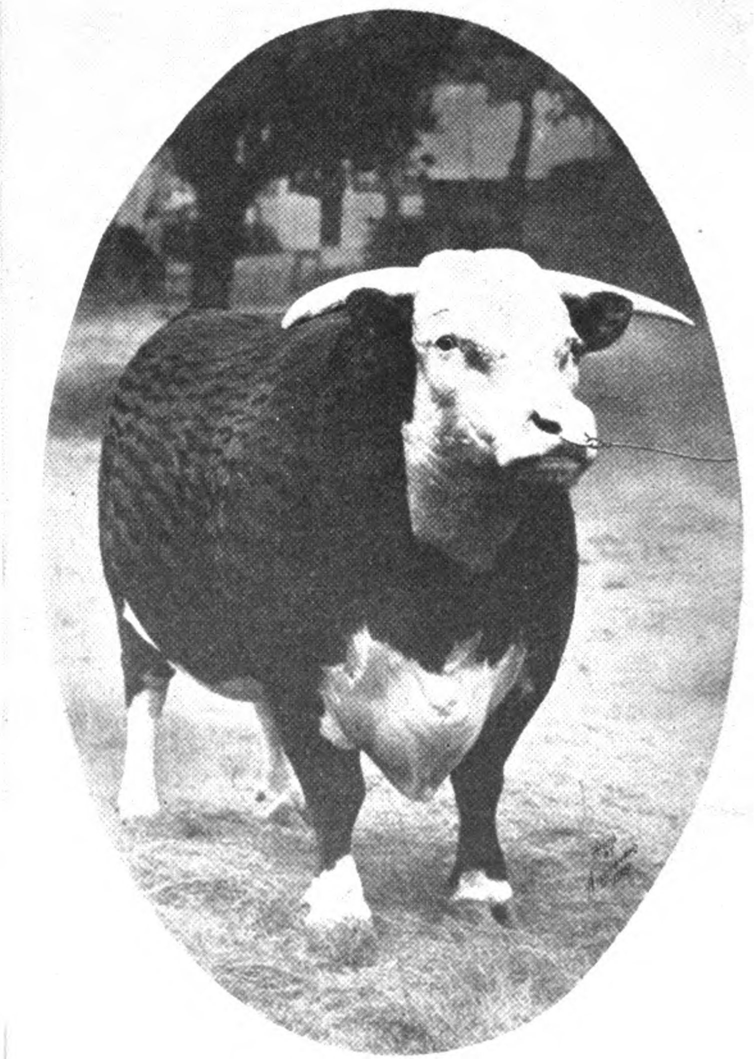
TABLE I. *Wheat bran, linseed meal (old process), cottonseed meal and alfalfa compared.*

	Experiment I.—February, 1906, to April, 1906, 8 weeks.				Experiment II.—November, 1906, to April, 1907, 20 weeks.			
RATIONS FED EACH GROUP OF 10 STEERS................	Shelled corn 75 per cent, bran 25 per cent, prairie hay..	Shelled corn 90 per cent, linseed meal 10 per cent, prairie hay..........	Shelled corn 90 per cent, cottonseed meal, 10 per cent, prairie hay.......	Corn 100 per cent, alfalfa hay and prairie hay (equal parts)...........	Corn 78 per cent, bran 22 per cent, corn stover......	Corn 90 per cent, linseed meal 10 per cent, corn stover............	Corn 90 per cent, cottonseed meal 10 per cent, corn stover...........	Corn 100 per cent, alfalfa hay and corn stover (equal parts)...........
Average initial weight per steer, lbs	1,146	1,187	1,154	1,164	973	976	988	978
Average daily gain per steer, lbs....	1.98	2.52	2.29	2.29	1.76	2.33	2.11	2.42
Average amount of grain consumed daily per steer, lbs....................	25.20	24.60	24.60	23.20	24.97	23.02	22.83	22.33
Average amount of roughage consumed daily per steer, lbs....	5.50	6.80	6.20	8.10	8.91	8.96	8.89	9.77
Grain consumed for one pound of gain, lbs..................................	12.97	9.77	10.77	10.16	14.19	9.88	10.83	9.22
Roughage consumed for one pound of gain, lbs	2.78	2.70	2.72	3.55	5.06	3.85	4.21	4.03
Total food consumed for one pound of gain, lbs..............................	15.75	12.47	13.49	13.71	19.25	13.73	15.04	13.25
Cost of 100 pounds of gain	$9 31	$7 87	$8 59	$7 40	$10 49	$7 64	$8 26	$6 99
Value of pork produced as a by-product for 100 pounds of gain on steers....	1 00	84	68	1 07	2 30	1 31	1 68	1 53
Net cost of food for 100 pounds of gain....................................	8 31	7 03	7 91	6 33	8 19	6 33	6 58	5 46
Cost of steers per hundred (delivered)......................................	4 15	4 15	4 15	4 15	4 58	4 58	4 58	4 58
Net selling price per hundred...	4 60	4 60	4 60	4 60	5 08	5 23	5 23	5 38
Net profit or loss per head, including pork produced	Profit $0 57	Profit $1 43	Profit $0 47	Profit $2 58	Loss $3 91	Profit $1 65	Profit $1 32	Profit $6 38



Hereford bull, Prime Lad 294334.

COLD PRESSED COTTONSEED CAKE.

During the winter of 1908 a test of these foods was again made, six instead of ten steers being fed on each ration, practically all of which were two-year-old grade Short-horns, and cold pressed cottonseed cake substituted for cottonseed meal. In this experiment a new policy was inaugurated, namely, that of making records of feed consumed and gains made by each animal of the several groups. For purposes of comparison with the preceding experiments the following table shows the average by group. In later tables the individual records of each steer are shown.

TABLE II. *Wheat bran, linseed meal, cold pressed cottonseed cake, ana alfalfa compared.*

	Experiment III.—February, 1908, to May, 1908, 12 weeks.			
RATIONS FED EACH GROUP OF SIX STEERS.........	Corn 75 per cent, bran 25 per cent, and corn stover.	Corn 90 per cent, linseed meal 10 per cent, and corn stover....	Corn 90 per cent, cottonseed cake 10 per cent, and corn stover....	Corn 100 per cent, alfalfa and corn stover........
Average initial weight per steer, lbs.........................	1,033	1,025	1,034	1,046
Average daily gain per steer, lbs	2.53	2.43	2.80	2.55
Average amount of grain consumed daily per steer, lbs....	21.20	20.99	21.03	19.86
Average amount of roughage consumed daily per steer, lbs..	7.61	8.03	8.89	8.79
Grain consumed for one pound of gain, lbs.................	8.37	8 62	7.56	7.78
Roughage consumed for one pound of gain, lbs.............	3.00	3.30	2.70	3.44
Total food consumed for one pound of gain, lbs.............	11.37	11.92	10.26	11.22
Cost of 100 pounds of gain	$9 24	$9 64	$8 29	$8 77
Value of pork produced as a by-product for 100 pounds of gain on steers	91	1 01	1 06	1 24
Net cost of food for 100 pounds of gain.....................	8 33	8 63	7 23	7 53
Cost of each steer per hundred pounds (delivered).........	4 60	4 60	4 60	4 60
Net selling price per hundred	5 79	5 69	5 79	5 89
Net profit per head, including pork produced...........	$5 15	$3 44	$6 87	$8 16

The results of the third experiment, as shown in table II, do not agree with those of the two former experiments, in that bran gave a slightly larger daily gain than linseed meal, at a lower cost and with a correspondingly larger profit. The new product, called cold pressed cottonseed cake, used in place of the cottonseed meal of the former experiments, seemed to be a superior feed. The largest daily gains were made on cottonseed cake and at less cost, though the profits were not quite so great as those on alfalfa because the alfalfa steers sold for a slightly higher price per hundred. Why linseed meal should give the lowest gains is not easily explained, in view of the fact that in both previous experiments it gave most excellent results. The meal used in this experiment was coarsely ground, called "pea size," and was purchased from a northern company for old process, at a price $1 per ton below Omaha quotations. That it was inferior to the linseed meal used the two preceding winters was shown by the presence of more fine material and the fact that it was less relished. The station chemist also reported it to contain but 3.1 per cent fat and 25.5 per cent protein, whereas the old process meal previously fed contained about 6 per cent fat and 32 per cent protein. The analysis of all foods used in this experiment, as reported by the station chemist, is as follows:

SAMPLE.	Moisture.	Ether extract.	Crude fiber.	Crude protein.	Ash.	Nitrogen-free extract.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Wheat bran	12.09	3.57	10.11	11.53	6.80	55.90
Cold pressed cottonseed cake	10.32	6.14	22.37	32.85	4.43	23.89
Linseed meal	9.72	3.10	8.82	25.57	5.00	47.79
Shredded corn stover	10.82	1.24	29.42	4.85	6.85	47.82
First cutting alfalfa	13.45	1.09	35.87	9.60	6.95	33.04
Third cutting alfalfa	13.10	1.89	22.23	17.40	8.51	36.87

Cold pressed cottonseed cake, which gave the largest gains, was highest in protein, and, unlike our former experiences with old process cottonseed meal, was consumed with more relish than the linseed meal fed lot 2. The fact that in the manufacture of this cottonseed cake the oil is removed by pressure, and not by the use of heat and chemical solvents, is a possible explanation of the higher value it seemed to show in this test, as in such preparation the albumen is not coagulated and it is therefore more digestible.

The alfalfa fed during the first eight weeks of the experiment was first-cutting hay, very stemmy in character, and not well cured, many of the leaves having fallen off. During the last four weeks a much better grade of alfalfa was used. This was third-cutting hay, exceptionally well cured, and very unlike the first used in that all the leaves seemed to be present. Much better results came from feeding the better grade of hay, which is readily understood when the analyses of the two kinds are compared. The corn stover used in this experiment was shredded, because the steers were fed separately in barn mangers too short for feeding the stalks entire. The corn was cut and shocked immediately after ripening, and the shredding was done about two months later. This stover was of good quality, as one might infer by noting the gains made on this feed used as the sole roughage in three of the lots. The steers in the fourth lot were fed stover in the morning and alfalfa at night. There was a considerable waste of stalks, as is indicated in the table, the greater part of which was coarse butts, which, though shredded, seemed to be unpalatable and practically worthless as a feed. While this refuse was weighed back, all stover fed was charged to the cattle just as though it had been completely consumed. The prices on the feeds used were f. o. b. Lincoln in car lots at the beginning of the experiment, and were as follows:

Corn, 52 cents per bushel (92.8 cents per hundred).
Cottonseed cake, $25 per ton.
Linseed meal, $29.70 per ton.
Bran, $22 per ton.
Alfalfa, $7 per ton.
Shredded corn stover, $4 per ton.

Experts in Swift & Co.'s coolers appraising each carcass.

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While in the three experiments reported an effort was made to have one lot of steers average in size, quality and condition with every other lot, some variation is to be expected, due to the individuality of the steers used in the test. For this reason it seems desirable to continue a given line of investigation from year to year or until the results may be considered fairly conclusive. The findings of the first two experiments agree closely, and lead one to believe that a good quality of old-process linseed meal in which there has been no steam or chemicals used is slightly superior to old-process cottonseed meal by which the seeds are cooked and the oil is removed with a chemical solvent; and that, further, this old-process cottonseed meal is superior to wheat bran, both from the viewpoint of gains and from that of economy of production at current market values. The one test most recently made is indicative of the high value of the new cold pressed cottonseed cake and the economy of its use. This test also puts wheat bran in a better light, and would seem to discourage the use of an inferior grade of linseed meal, which is quoted to farmers at a lower price than the best grade in order to make it a more attractive proposition.

All three tests show that alfalfa can be fed with corn and either prairie hay or corn stover with exceedingly good results as to daily gains, and with profits which seem to put it at the head of the list of protein foods for economical beef production, when it can be had at the usual price received for it on the average Nebraska farm where grown. If the feeder grows his own alfalfa the price could be put lower and still the land would return a high rate of interest upon the investment.

QUALITY OF THE CARCASSES.

The cattle in this experiment were purchased by Swift & Co. of South Omaha and slaughtered in their plant, where records were made on the dressing of each steer, the shape and covering of the carcasses, and the texture, color and marbling of the meat. An expert furnished by the company also appraised each carcass on the basis of existing market quotations on dressed beef.

The average dressing of the six steers in group I, fed on corn supplemented with bran, was 58.0 per cent; group II (linseed meal), 58.05 per cent; group III (cold pressed cottonseed cake), 58.25 per cent; group IV (alfalfa), 59.7 per cent. The caul fat taken from the steers of each group averaged per steer as follows: Group I, 22.7 pounds; group II, 23.3 pounds; group III, 18.5 pounds; and group IV, 22 pounds. The average value of the carcasses per hundred pounds as appraised was as follows, by group: I, $10.12; II, $10.21; III, $10.29; and IV, $10.42. This valuation was made by the expert on the basis of shape, color, texture and marbling, without knowledge on his part of the previous manner of feeding. The net price received per hundred weight for the steers (home weights on foot at the close of the experiment) was $5.79 per hundred for the bran group, $5.69 for the linseed-meal group, $5.79 for the cottonseed-cake group, and $5.89 for the alfalfa group. On the basis of dressing and quality of carcasses, with the bran steers worth $5.79, the linseed-meal steers should have brought $5.85, the cottonseed-cake steers $5.92, and the alfalfa-fed steers $6.14. The buyer was there-

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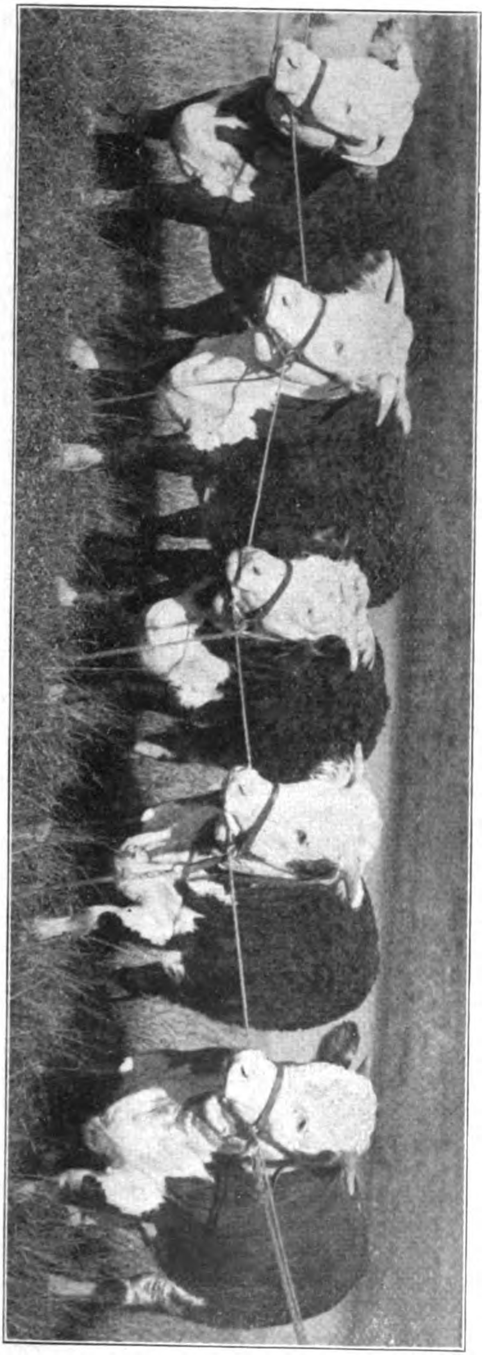

Herefords with their bloom all on.

fore right in paying more for the alfalfa steers, but he should have priced them 22 cents per hundred higher than any other lot, rather than 10 cents higher. The rating on the cottonseed-cake steers as compared with the linseed-meal steers was approximately correct, but the bran steers should have been rated 6 cents per hundred lower than the linseed-meal steers instead of 10 cents higher. If the profits per steer were to be reckoned on the basis of dressed weights and quality of meat, alfalfa and cottonseed cake would show even better than the table indicates. The wonderful value of the alfalfa plant, not only for producing large gains, but also for its favorable effect upon the quality of beef, is here made evident. In this connection, to reinforce the observations made in this experiment, the writer wishes to call attention to the results of the awards in the carcass contest at the recent International Live Stock Exposition in Chicago (1909), in which cattle from different parts of the United States and Canada competed. In this contest the four highest prizes, including the grand championship carcass, were won by University of Nebraska steers, which had been fed on mixed grain rations supplemented with a liberal quantity of alfalfa. These carcasses were uniformly well covered, nicely marbled, the lean bright red in color, and the texture good. The writer is of the opinion that alfalfa was an important factor in giving this quality.

CORN STOVER WITH ALFALFA MOST PROFITABLE.

In bulletin 100 an experiment was reported in which a heavy feed of shelled corn and alfalfa was compared with a heavy feed of shelled corn, alfalfa and corn stover. When the stover was introduced the average daily gain made by the ten steers was 2.4 pounds, as compared with 2.3 pounds made by the ten fed corn and alfalfa alone, and the cost of 100 pounds of gain was $6.49 with stover and $6.89 without, the stover being figured at $2.50 per ton and the alfalfa $6. The following year, when a light feed of snapped corn was used, the daily gain was 0.1 pound less with alfalfa and stover than with alfalfa alone, but here again the cost of producing 100 pounds of gain was 50 cents per hundred less by the use of both stover and alfalfa for roughage, and the profits correspondingly greater. From these results it would seem less necessary to use stover when snapped corn is fed, very likely because the husk and cob serve to some degree the same purpose as the stover, lessening the tendency of the cattle to scour and at the same time giving more variety to the ration. From the entire series of experiments made it seems safe to conclude that beef in Nebraska can be most profitably produced on some combination of the corn plant and alfalfa hay.

THE MOST ECONOMICAL PROPORTION OF CORN TO ALFALFA.

The next logical step was to determine the most economical proportion of corn to alfalfa—whether a heavy feed of grain, a medium feed, or a light feed with correspondingly more alfalfa. Three experiments have been made dealing with this problem. In the first a little more than a half feed of shelled corn (13.9 pounds daily to each steer) was compared with a full feed (22.3 pounds), the roughage consisting of alfalfa and corn stover. In the second, three different quantities of grain were used, 12, 17 and 19.8 pounds, and in the third 12, 15.6 and 18.8 pounds. The

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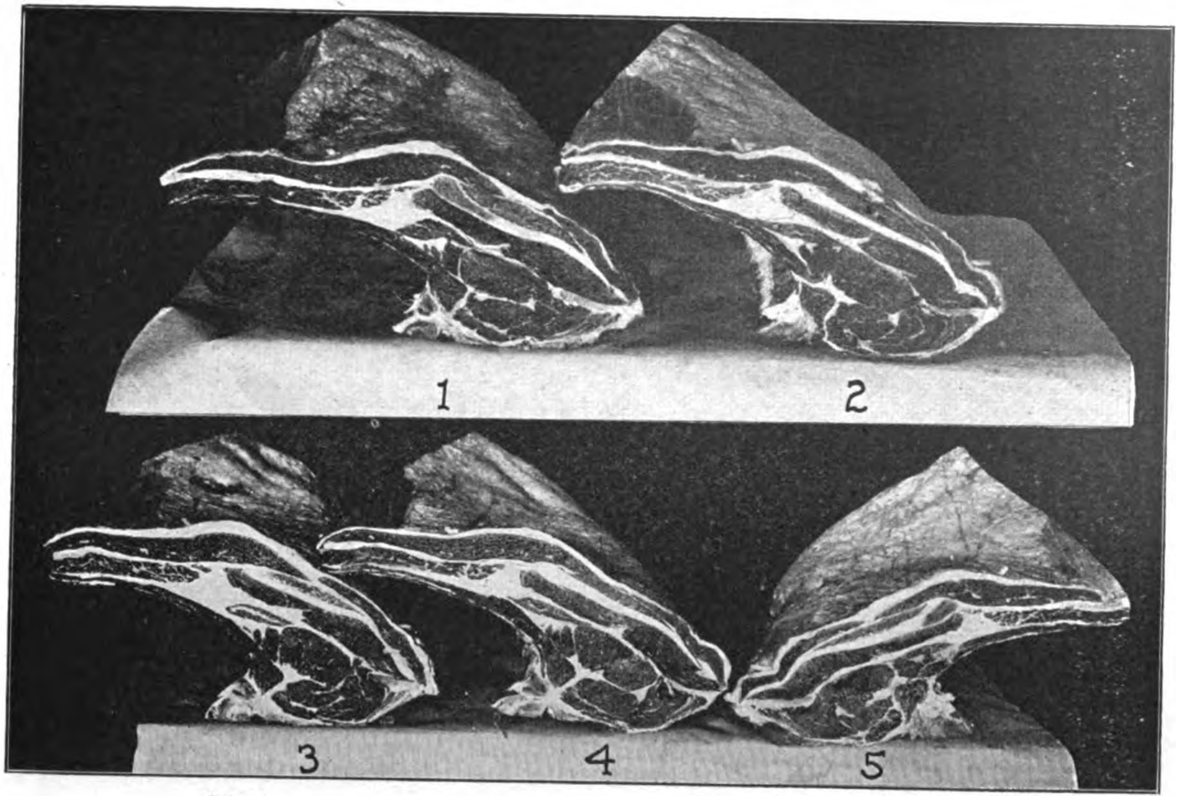

Rib cut from the best carcass of each group.
(1) Corn, linseed meal, and corn stover.
(2) Corn, bran, and corn stover.
(3) Corn, alfalfa, and corn stover (best carcass in experiment).
(4) Corn, cottonseed cake, and corn stover.
(5) Corn, cottonseed cake, and corn stover (poorest carcass in experiment).

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same kind of roughage was used in the second as in the first, namely, alfalfa and shredded stover, the latter being more convenient to weigh and feed than unshredded stover. In the third, only alfalfa was fed for roughage and corn meal was substituted for shelled corn to eliminate entirely the pork factor, as this seems to be more or less variable and less easily controlled.

Table III, page 249, includes the results of the three experiments, the figures representing the average for each steer by group.

From table III it will be seen that in experiment I, in which the roughage consisted of alfalfa and corn stover, the light-fed steers gained 0.41 pound less per day for a period of twenty-four weeks than the heavy-fed steers during a period of twenty weeks. The average gain of each steer of the two groups—one fed four weeks longer than the other—was the same, viz., 339 pounds. With corn then worth 36 cents per bushel, alfalfa $6 per ton on the farm where grown, and unshredded stover $2.50 per ton, the net cost of producing gains was 27 cents per hundred pounds less with the light grain ration than with the heavy. Had the corn cost 34 cents per bushel the net cost of producing gains would have been the same in both groups.

In 1908, when the second experiment was made, corn was worth 52 cents per bushel, alfalfa $7 per ton, and the shredded stover was valued at $4 per ton. At these prices the cost of producing gains was again least on the light feed of corn, but the profits were somewhat higher on the heavier-fed cattle, because they were all fed the same length of time and sold on the same date, the light-fed cattle bringing 25 cents per hundred less than the heavier-fed cattle. Had the light-fed cattle been fed an extra month they would have undoubtedly shown as much condition of flesh and would then have brought as much per pound. On that basis the profits per steer in this group would have been $8.76 instead of $5.76. Had the alfalfa in this experiment been figured at $6 per ton instead of $7, the cost of producing 100 pounds of gain on the light feed of corn would have been $6.85 and on the medium and heavy feeds $7.36. In this experiment had the corn cost 32 cents per bushel, with alfalfa worth $6 per ton instead of $7 as before, the net cost of producing gains would have been the same on the heavy grain ration as on the light.

In the last experiment we have the best showing of all for the light-fed cattle. In this test the corn was ground to eliminate pork from the calculations, and no stover was fed. On corn meal a full grain ration for two-year-old steers seemed to be about 3 pounds per day less than on shelled corn. From this it might be inferred that a steer's capacity is limited by the amount of grain assimilated rather than by the amount fed, as much corn passes through undigested when the whole grain is used. In this experiment corn was figured at 56 cents, with 4 cents added for grinding, making it 60 cents per bushel, or $1.07 per hundred. With alfalfa at $7 per ton, the cost of gains on the light-fed steers was 81 cents per hundred less than on the medium-fed group, and $1.67 less than on the heavy-fed group. With alfalfa at $7 per ton, the cost of gains on the light- and heavy-fed cattle would have been the same had the corn cost 25 cents per bushel. With alfalfa at $6, the cost would have been the same with corn at 21 cents per bushel. In this experiment, however, the

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TABLE III. *The most economical proportion of corn to alfalfa.*

RATIONS FED EACH GROUP OF 10 STEERS IN EXPERIMENT I AND 6 STEERS IN EXPERIMENTS II AND III.	Experiment I.		Experiment II.			Experiment III.		
	Nov., '06, to Apr., '07. 20 weeks.	Nov., '06, to May, '07. 24 weeks.	Feb., '08, to May, '08. 12 weeks.	Feb., '08, to May, '08. 12 weeks.	Feb., '08, to May, '08. 12 weeks.	Jan., '09, to Jun., '09. 20 weeks.	Jan., '09, to Jun., '09. 20 weeks.	Jan., '09, to Jun., '09. 20 weeks.
	Corn (heavy feed), alfalfa hay 50 per cent, corn stover 50 per cent.	Corn (light feed), alfalfa hay 60 per cent, corn stover 40 per cent.	Corn (heavy feed), alfalfa 45 per cent, corn stover 55 per cent	Corn (medium feed), alfalfa 55 per cent, corn stover 45 per cent	Corn (light feed), alfalfa 60 per cent, corn stover 40 per cent	Corn meal (heavy feed), alfalfa.	Corn meal (medium feed), alfalfa.	Corn meal (light feed), alfalfa.
Average initial weight per steer, pounds	978	977	1,046	1,057	1,035	865	873	878
Average daily gain per steer, pounds	2.42	2.01	2.55	2.34	2.08	2.73	2.86	2.71
Average amount of grain consumed daily per steer, pounds	22.33	13.89	19.86	17.15	12.00	18.80	15.63	12.00
Average amount of roughage consumed daily per steer, pounds	9.77	18.08	8.79	9.66	14.02	8.73	15.07	17.20
Average amount of grain consumed for one pound of gain, pounds	9.22	6.91	7.78	7.32	5.76	6.97	5.51	4.42
Average amount of roughage consumed for one pound of gain, pounds	4.03	8.96	3.44	4.37	6.75	3.21	5.30	6.34
Average cost of 100 pounds of gain	$6 78	$6 51	$8 77	$8 76	$8 03	$8 62	$7 76	$6 95
Value of pork produced as a by-product for 100 pounds of gain on steers	1 53	1 44	1 24	1 18	75	0 00	0 00	0 00
Net cost of feed for 100 pounds of gain	5 25	5 07	7 53	7 58	7 29	8 62	7 76	6 95
Initial cost of steers per hundred pounds (net)	4 58	4 58	4 60	4 60	4 60	4 90	4 90	4 90
Selling price of steers per hundred pounds (net)	5 88	5 88	5 89	5 88	5 64	6 02	6 00	5 95
Profit per steer, including pork produced from droppings	$7 10	$7 47	$8 16	$7 71	$5 76	$2 00	$4 46	$6 57

heavy-fed steers were placed at a disadvantage because alfalfa was used alone as roughage. With a heavy feed of clear corn and alfalfa, cattle seem to be affected to a considerable degree with scours, much more so than when either corn stover, prairie hay or cane is fed with it. These cattle were off feed several times, and a reference to the table will show that they consumed less in consequence and made a smaller daily gain than the medium-fed cattle. Their average daily consumption of grain and hay was but 26.5 pounds, as compared with 30.7 pounds for the medium-fed group, and 29.2 pounds for the light-fed group. The alfalfa was for the most part excellent in quality and greatly relished. The records show that with such hay remarkably good gains may be made on 12 pounds of corn and all the alfalfa that will be consumed.

That the medium-fed cattle in experiment II were just as good when finished is shown by the fact that both groups sold for practically the same price on the same day. The light-fed group were in lower condition and undersold the other groups 25 cents per hundred. They should have had an extra month's feed. The dressing when killed was as follows: Group I, 59.7 per cent of live weight; group II, 60.1 per cent; group III, 58.3 per cent. In experiment III the same thing was found true. The groups fed the medium and heavy grain rations dressed practically the same per cent, with a slight difference in favor of the medium group. Those fed the light grain ration dressed somewhat less because of their lower condition.

From the results of this series of experiments it seems safe to say that with corn above 35 cents per bushel and with alfalfa not to exceed $7 per ton, the old method of fattening cattle for market, namely, that of crowding with grain and using but little roughage, is much less profitable than a more moderate use of grain and correspondingly more roughage. Not to exceed three-fourths of a full feed of corn and a correspondingly larger quantity of alfalfa will give practically the same daily gains; the cattle will take on quite as good a finish during an equal length of time on feed, and will bring as much per pound as when given all the corn that will be consumed, and these things will be accomplished at a reduced cost of production, with larger profits to the feeder. With a good quality of alfalfa at $6 per ton or less, and corn above 50 cents per bushel, something approaching half a full feed of corn is still more profitable if one is in a position to keep the cattle in the feed lot one or two months longer than the usual time given to a full feed of grain. Lengthening the feeding period increases to some extent the interest charges on the money invested and the labor connected with the feeding operations, but with the more liberal use of alfalfa the manure is more valuable and a larger market provided at the farm for a hay crop, which at $6 or more per ton in the stack or mow is exceedingly profitable to grow. Allowing $1.50 per ton for harvesting the crop, a field of alfalfa yielding 4 tons to the acre for the season—an average crop in Nebraska—the net revenue per acre at $4.50 per ton would amount to $18, which is 6 per cent interest on $300 per acre. With the increased demand for corn and the limited area adapted for its successful growth, this grain is certain to command a much higher price in the future than it has in the past. From the results of this series of experiments it would seem advisable to make a

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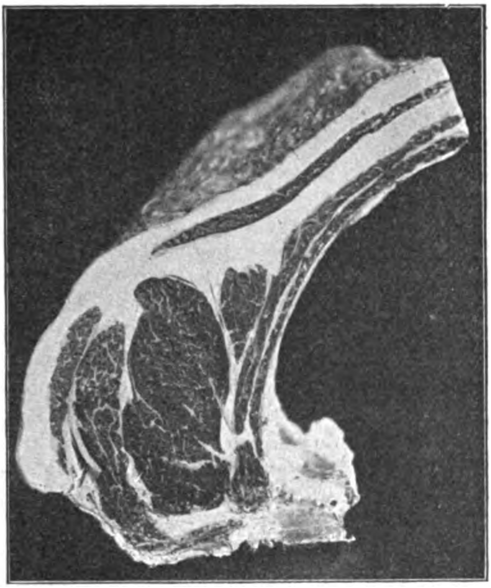
larger use of roughage and less grain than has been done in the past. Former experiments also show the advisability of feeding with the alfalfa some cornstalks to lessen scours, to furnish variety, and to lower the cost of production by the utilization of a cheap feed which otherwise goes to waste on the average Nebraska farm.



Rib from the Angus steer "La Preto," grand champion carcass (all breeds and ages), International Live Stock Exposition, Chicago, December, 1909. Fed and exhibited by Department of Animal Husbandry, University of Nebraska.

PART II.—ECONOMY OF PRODUCTION AS AFFECTED BY THE ANIMAL.

A large number of experiments have been made to determine the relative value of foods suitable for beef production, and it has been found that certain combinations that seem to meet fairly well the physiological requirements of the animal will make more pounds at less cost than other combinations not so well suited. Strange as it may seem, very little experimental data has been obtained to show individual differences in animals in their capacity to use food to the best advantage. It is a matter of common observation among cattle feeders that some steers gain faster than others, and numerous theories have been advanced to explain why this is so, but as yet they are mere theories. In the work of improving animals by methods of breeding the chief aim seems to have been to produce types that make the best carcasses and therefore bring a higher price per pound when sold, rather than those which make the most economical gains in the feed lot. Several tests have been made in which specimens of one breed have been compared with those of another, but the results would indicate that the matter of making economical gains is not a breed characteristic. Sometimes the best and poorest gains are found within the same breed. Most experimental feeding has been done in groups, and there has been no opportunity for observing individual differences. Thinking that this might be a field for profitable study to determine whether or not there are external indications as to form, etc., which denote feeding capacity, the writer three years ago adopted a system of keeping individual records of weights and gains on all cattle fed experimentally. To show that there is a wide variation in animals, the records for the steers used in the experiments described in Part I are here exhibited. In each group of one experiment were six steers, the first three of which were reared at the substation farm at North Platte, Neb., and were somewhat smoother, more compact and showed better breeding than the last three of each group. The better steers were figured at $5 per hundred at the beginning of the experiment, and the more common ones, all of which came from a western Nebraska ranch, cost $4.20 on weights at the beginning of the experiment, which included the cost of the preliminary feeding in both cases. The selling price indicated represents the net price actually received for each steer on the basis of closing weights at the experiment station farm. The profit given is therefore net, except that nothing was charged for labor nor for interest on the investment. The value of the manure is usually considered an offset to labor in feeding practice. Each steer was tied in a stall when fed and the grain and roughage carefully weighed when put in the feed boxes and mangers. The weights of each steer as given are the averages of three taken on successive days, both at the beginning and at the close of the experiment. The tables follow:

From the tables it will be observed that the average daily gains in group I ranged from 2.20 to 2.86 pounds. These steers were each fed the same amount of grain, but roughage to the limit of their capacity. The stover actually consumed was approximately half the amount fed. The net profits per head ranged from $2.93 to $7.99. In this group the three steers having the most quality averaged slightly larger gains than the three more common types, but the net profits were highest on the latter, because the difference in the selling price was but 45 cents per hundred, whereas the difference in cost was 80 cents per hundred.

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TABLE IV. *Record of each steer in Group I, February, 1908, to May, 1908—12 weeks. Ration—corn, bran, and corn stover.*

Steer Number	1 (Good.)	2 (Good.)	3 (Good.)	4 (Common.)	5 (Common.)	6 (Common.)	**Average of first three, good.**	**Average of last three, common.**	**Average of all six steers.**
Initial weight of each steer, lbs	1,142	1,007	1,002	970	987	1,090	1,050	1,016	1,033
Final weight, lbs	1,327	1,247	1,240	1,207	1,177	1,277	1,271	1,220	1,245
Average gain of each steer, per day, lbs	2.20	2.86	2.83	2.82	2.26	2.23	2.63	2.44	2.53
Average amount of corn consumed by each steer per day, lbs	15.93	15.93	15.93	15.93	15.93	15.93	15.93	15.93	15.93
Average amount of bran consumed by each steer per day, lbs	5.27	5.27	5.27	5.27	5.27	5.27	5.27	5.27	5.27
Total grain consumed by each steer per day, lbs	21.20	21.20	21.20	21.20	21.20	21.20	21.20	21.20	21.20
Average amount of roughage (stover) fed each steer per day, lbs	15.62	12.22	12.53	14.00	14.85	14.96	13.46	14.60	14.03
Average amount of roughage (stover) consumed by each steer per day, lbs	9.05	5.58	6.16	7.30	8.71	8.90	6.93	8.30	7.61
Grain consumed per pound of gain, lbs	9.63	7.42	7.49	7.51	9.37	9.53	8.06	8.70	8.37
Roughage consumed per pound of gain, lbs	4.11	2.37	2.18	2.59	3.85	4.00	2.63	3.40	3.00
Total food consumed per pound of gain, lbs	13.74	9.79	9.67	10.10	13.22	13.53	10.69	12.10	11.37
Cost of food for 100 pounds of gain	$10 77	$8 05	$8 16	$8 29	$10 42	$10 58	$8 84	$9 63	$9 24
Value of pork produced with each 100 pounds gain on steers	91	91	91	91	91	91	91	91	91
Net cost of food for 100 pounds of gain	9 86	7 14	7 25	7 38	9 51	9 67	7 93	8 72	8 33
Initial cost of steer per 100 pounds	5 00	5 00	5 00	4 20	4 20	4 20	5 00	4 20	4 60
Selling price per 100 pounds	6 07	6 02	5 97	5 47	5 47	5 77	6 02	5 57	5 79
Net profit on each steer, including pork produced	$2 93	$5 57	$5 05	$6 16	$3 21	$7 99	$4 52	$5 79	$5 15

TABLE V. *Record of each steer in Group II, February, 1908, to May, 1908—12 weeks. Ration—corn, linseed meal and corn stover.*

STEER NUMBER	7 (Good.)	8 (Good.)	9 (Good.)	10 (Common)	11 (Common.)	12 (Common.)	Average of first hree, good.	Average of last three, common.	Average of all six steers.
Initial weight of each steer, lbs	1,020	1,047	1,053	1,033	1,027	970	1,040	1,010	1,025
Final weight, lbs	1,210	1,287	1,253	1,245	1,275	1,107	1,275	1,209	1,229
Average gain of each steer per day, lbs	2.26	2.86	2.39	2.52	2.96	1.63	2.50	2.37	2.43
Average amount of corn consumed by each steer per day, lbs	18.02	19.05	19.11	19.11	19.11	19.11	18.73	19.11	18.91
Average amount of linseed meal consumed by each steer per day, lbs	1.98	2.09	2.09	2.09	2.09	2.09	2.05	2.09	2.07
Total grain consumed by each steer per day, lbs	20.00	21.14	21.20	21.20	21.20	21.20	20.78	21.20	20.99
Average amount of roughage (stover) fed each steer per day, lbs	14.64	13.20	13.35	15.03	15.22	13.59	13.73	14.55	14.14
Average amount of roughage consumed by each steer per day, lbs	7.17	7.08	7.83	9.36	9.59	7.19	7.36	8.71	8.03
Grain consumed per pound of gain, lbs	8 84	7.40	8.90	8.40	7.15	8.29	8.31	8.95	8.62
Roughage consumed per pound of gain, lbs	3.17	2.48	3.29	2.24	1.90	3.80	2.93	3.66	3.30
Total food consumed per pound of gain, lbs	12.01	9.88	12.19	10.64	9.05	12.09	11.24	12.61	11.92
Cost of food for 100 pounds of gain	$9 87	$8 09	$9 76	$9 34	$7 99	$14 25	$9 27	$10 03	$9 64
Value of pork produced with each 100 lbs. gain on steers	1 01	1 01	1 01	1 01	1 01	1 01	1 01	1 01	1 01
Net cost of food for 100 pounds of gain	8 86	7 08	8 75	8 33	6 98	13 24	8 26	9 02	8 63
Initial cost of steer per 100 pounds	5 00	5 00	5 00	4 20	4 20	4 20	5 00	4 20	4 60
Net selling price per 100 pounds	5 72	5 92	5 72	5 77	5 77	5 17	5 79	5 59	5 69
Net profit or loss on each steer, including pork produced	Loss. $0 66	Profit. $4 76	Loss. $0 59	Profit. $9 06	Profit. $11 40	Loss. $3 28	Profit. $1 17	Profit. $5 72	Profit. $3 44

TABLE VI. *Record of each steer in Group III, February, 1908, to May, 1908—12 weeks. Ration—corn, cottonseed cake and corn stover.*

Steer Number	13 (Good.)	14 (Good.)	15 (Good.)	16 (Common.)	17 (Common.)	18 (Common.)	**Average of first three, good.**	**Average of last three, common.**	**Average of all six steers.**
Initial weight of each steer, lbs	1,225	1,077	1,043	997	902	963	1,115	954	1,034
Final weight, lbs	1,367	1,337	1,307	1,220	1,187	1,203	1,337	1,208	1,270
Average gain of each steer per day, lbs	1.69	3.10	3.14	2.65	3.39	2.85	2.64	2.96	2.80
Average amount of corn consumed by each steer per day, lbs	19.11	19.11	19.11	19.11	19.00	18.29	19.11	18.80	18.95
Average amount of cottonseed cake consumed by each steer per day, lbs	2 09	2.09	2.09	2.09	2.07	2.01	2.09	2.06	2.07
Total grain consumed by each steer per day, lbs	21.20	21.20	21.20	21.20	21.08	20.30	21.20	20.86	21.03
Average amount of roughage (stover) fed each steer per day, lbs	16.81	14.43	14.43	13.97	14.00	12.54	15.22	13.50	14.86
Average amount of roughage consumed by each steer per day, lbs	10.11	7.54	7.54	8.42	7.14	12.54	8.40	9.36	8.89
Grain consumed per pound of gain, lbs	12 55	6.85	6.75	6.75	6.21	7.10	8.02	7.14	7.56
Roughage consumed per pound of gain, lbs	6.05	2.47	2.47	3.12	2.10	1.81	3 14	2.32	2.70
Total food consumed per pound of gain, lbs	18.60	9.32	9.22	9.87	8.31	8.91	11.16	9.46	10.26
Cost of food for 100 pounds of gain	$14 15	$7 56	$7 47	$8 81	$6 86	$7 79	$8 93	$7 74	$8 29
Value of pork produced with each 100 pounds of gain on steers	1 06	1 06	1 06	1 06	1 06	1 06	1 06	1 06	1 06
Net cost of food for 100 pounds of gain	13 09	6 50	6 41	7 75	5 80	6 73	7 87	6 68	7 23
Initial cost of steer per 100 pounds	5 00	5 00	5 00	4 20	4 20	4 20	5 00	4 20	4 60
Net selling price per 100 pounds	6 02	6 07	5 97	5 37	5 67	5 67	6 02	5 56	5 79
Net profit on each steer, including pork produced	$0 01	$8 26	$6 88	$4 69	$11 88	$10 00	$5 05	$8 69	$6 87

TABLE VII. *Record of each steer in Group IV, February, 1908, to May, 1908—12 weeks. Ration—corn, alfalfa and corn stover.*

STEER NUMBER	19 (Good.)	20 (Good.)	21 (Good.)	22 (Common.)	23 (Common.)	24 (Common.)	Average of first three, good.	Average of last three. common.	Average of all six steers.
Initial weight of each steer, pounds	977	1,067	1,085	1,080	972	1,097	1,043	1,049	1,046
Final weight, pounds	1,237	1,278	1,308	1,230	1,205	1,305	1,274	1,247	1,260
Average gain of each steer per day, pounds	3.10	2.52	2.65	1.78	2.77	2.48	2.75	2.34	2.55
Average amount of corn consumed by each steer per day, pounds,	20.60	18 81	20.74	18.11	20.85	20.08	20.05	19.68	19.86
Average amount of alfalfa fed each steer per day, pounds	5.96	6.54	7.77	6.54	7.35	7.32	6.76	7 07	6.91
Average amount of corn stover fed each steer per day, pounds	8.18	7.10	7.66	7.00	7.56	7.42	7.65	7.83	7.49
Total amount of roughage consumed by each steer per day, pounds	7.23	8.25	10.28	7.58	9.86	9.54	8.59	8.99	8.79
Grain consumed per pound of gain, pounds	6.65	7.48	7.81	10.14	7.52	8.11	7.28	8.39	7.78
Roughage consumed per pound of gain, pounds	2.34	3.19	3.86	4 25	3.55	3.85	3.09	3.82	3.44
Total food consumed per pound of gain, pounds	8.99	10 67	11.67	14.39	11.07	11.96	10.37	12.21	11.22
Cost of food for 100 pounds of gain	$7 36	$8 41	$8 86	$11 50	$8 45	$9 18	$8 17	$9 47	$8 77
Value of pork produced with each 100 pounds gain on steers	1 24	1 24	1 24	1 24	1 24	1 24	1 24	1 24	1 24
Net cost of food for 100 pounds of gain	6 12	7 17	7 62	10 26	7 21	7 94	6 93	8 23	7 53
Initial cost of steer per 100 pounds	5 00	5 00	5 00	4 20	4 20	4 20	5 00	4 20	4 60
Net selling price per 100 pounds	6 02	6 02	6 02	5 77	5 77	5 77	6 02	5 77	5 89
Net profit on each steer, including pork produced	$7 75	$6 32	$5 33	$8 41	$10 28	$10 88	$6 47	$9 86	$8 16

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TABLE VIII. *Record of each steer in Group V, February, 1908, to May, 1908—12 weeks. Ration—corn (medium feed), alfalfa and corn stover.*

STEER NUMBER	25 (Good.)	26 (Good.)	27 (Good.)	28 (Common.)	29 (Common.)	30 (Common.)	Average of first three, good.	Average of last three, common.	Average of all six steers.
Initial weight of each steer, lbs	1,060	1,173	1,098	960	1,008	1,055	1,109	1,006	1,057
Final weight	1,279	1,343	1,277	1,177	1,229	1,220	1,300	1,209	1,254
Average gain of each steer per day, lbs	2.60	2.02	2.19	2.58	2 69	1.96	2.27	2.41	2.34
Average amount of corn consumed by each steer per day, lbs	17,12	16.80	17.01	17.33	17.33	17.33	16.98	17.33	17.15
Average amount of alfalfa fed each steer by day, lbs	9.15	7.36	8.42	9.18	9.02	8.48	8.31	8.88	8.59
Average amount of corn stover fed each steer per day, lbs	8.08	7.49	7.87	8.18	8.07	7.87	7.81	8.04	7.97
Total amount of roughage consumed by each steer per day, lbs	11.11	8.42	6.47	11.89	10 31	9.77	8.67	10.66	9.66
Grain consumed per pound of gain, lbs	6.56	8 30	7.77	6.71	6.44	8.83	7.46	7.18	7.32
Roughage consumed per pound of gain, lbs	4.26	4 22	2.95	4.60	3.80	4.98	4.32	4.42	4.37
Total food consumed per pound of gain, lbs	10.82	12.51	9.71	11.31	10.24	13.81	11.78	11.60	11.69
Cost of food for 100 pounds of gain	$7 96	$9 72	$9 26	$8 00	$7 76	$10 50	$8 91	$8 62	$8 76
Value of pork produced with each 100 pounds gain on steers	1 18	1 18	1 18	1 18	1 18	1 18	1 18	1 18	1 18
Net cost of food for 100 pounds of gain	6 78	8 54	8 08	6 82	6 58	9 32	7 73	7 44	7 58
Initial cost of steer per 100 pounds	5 00	5 00	5 00	4 20	4 20	4 20	5 00	4 20	4 60
Net selling price per 100 pounds	5 97	6 07	6 02	5 62	5 77	5 62	6 02	5 67	5 88
Net profit on each steer, including pork produced	$6 38	$6 01	$5 16	$9 40	$12 23	$7 10	$5 85	$9 58	$7 71

TABLE IX. *Record of each steer in Group VI, February, 1908, to May, 1908—12 weeks. Ration—corn (light feed), alfalfa and corn stover.*

STEER NUMBER	31 (Good.)	32 (Good.)	33 (Good.)	34 (Common.)	35 (Common.)	36 (Common.)	Average of first three, good.	Average of last three, common.	Average of all six steers.
Initial weight of each steer, lbs	1,042	1,027	1,210	1,050	807	1,073	1,093	977	1,035
Final weight	1,210	1,200	1,377	1,263	1,000	1,207	1,262	1,163	1,209
Average gain of each steer per day, lbs	2.00	2.06	1.99	2.53	2.29	1.59	2.02	2.14	2.08
Average amount of corn consumed by each steer per day, lbs	12.00	12.00	12 00	12 00	12.00	12.00	12.00	12.00	12.00
Average amount of alfalfa fed each steer per day, lbs	10.66	10 71	11.75	12.85	7.45	11.40	11.04	10 57	10.80
Average amount of corn stover fed each steer per day, lbs	8.75	8.88	9 01	9.34	7 46	8.94	8 88	8 58	8.73
Total amount of roughage consumed by each steer per day, lbs	13 30	13.83	16.25	17.92	7.86	14.99	14.46	13 59	14.02
Grain consumed per pound of gain, lbs	5.10	5.83	5.10	4.73	5.22	7.52	5 93	5.60	5.76
Roughage consumed per pound of gain, lbs	6 65	6.72	8.11	7.06	3.42	9.88	7.17	6.34	6.75
Total food consumed per pound of gain, lbs	11.75	12.55	13.21	11.79	8.64	16.90	13.10	11.94	12.51
Cost of 100 pounds of gain	$8 30	$8 08	$8 56	$6 91	$6 63	$10 60	$8 82	$7 73	$8 03
Value of pork produced with 100 pounds of gain on steers	75	75	75	75	75	75	75	75	75
Net cost of food per 100 pounds of gain	7 55	7 33	7 81	6 16	5 88	9 85	7 57	6 98	7 29
Initial cost of steer per 100 lbs	5 00	5 00	5 00	4 20	4 20	4 20	5 00	4 20	4 60
Net selling price per 100 lbs	5 82	5 82	5 82	5 67	5 17	5 42	5 82	5 44	5 64
Net profit on each steer, including pork produced	$3 56	$3 75	$4 17	$12 62	$5 10	$5 35	$3 83	$7 69	$5 76

In group II the average daily gains ranged from 1.63 pounds to 2.96 pounds, a difference of 1.33 pounds per day. A part of this wide variation is no doubt due to the fact that steer No. 12 was of a very nervous disposition and rather difficult to handle. Of the remaining five, all of which were quiet, the variation was 0.7 pound per day. The steers of this group were fed all the grain and stover they would consume, No. 7 showing an inclination to eat somewhat less than the others. That some individuals are much more economical producers than others is shown by the fact that steer No. 9 required over one-fifth more food for a given gain than steer No. 8. Here again the average of the three good steers in daily gains was slightly higher than the three common, but this was due to the poor showing made by No. 12, the one inclined to be nervous. The largest gainer was one on the common order, and the two smallest gainers were good types. Here again the profits per head were larger on the common steers because their original cost was 80 cents per hundred less and the selling price but 20 cents less.

In group III we have the widest variation in gains of all groups. One steer, No. 13, gained but 1.69 pounds per day, while another on the same ration, No. 17, gained 3.39 pounds per day—just twice as much. This latter steer was a strong, vigorous type, rather heavy in bone though not particularly coarse. He was the largest gainer of the entire number in the experiment, and it is more or less significant that he had the largest heart girth (circumference of body just behind the fore legs) and the largest middle girth of any steer, weight considered. No. 13, the lowest gainer, was somewhat handicapped by the fact that he carried more flesh than the others at the beginning of the experiment, and this was very likely responsible, in part at least, for his poor showing. No. 16 was as thin as No. 17 at the beginning and gained 0.74 pounds less per day. He was on the coarse, angular order, narrow-chested, but no more so than No. 18. No. 16 was a poor seller, as indicated by the table. In this group the three common steers made the largest combined gains because of the poor showing made by No. 13. They were also more profitable to feed, because they sold relatively higher as killers at the close than as feeders at the beginning of the experiment.

In group IV the largest gains were made by one of the good types, No. 19, and the lowest by one of the common, No. 22, a difference of 1.32 pounds per day. It was not due to condition, as No. 22 was fully as thin in flesh as No. 19 at the beginning. No. 19 was considerably wider in chest and larger in middle girth for weight. He was also somewhat smaller in bone and showed a more pliable skin. The next largest gainer in this group was one of the common steers. As in all previous groups, there seems to be no regularity, the best and poorest gainers being very evenly distributed among the so-called good and common types, though the better steers of all four groups made a slightly higher average gain.

In the two lighter-fed groups, V and VI, we find a variation in the former as high as 0.73 pound per day, and in the latter 0.94 pound, and these extremes in group VI were both steers of the common sort, in very nearly the same condition to begin with. Steer No. 34 showed more capacity for roughage than No. 36, but this could not account for the wide difference in gains. The chest and middle girth measurements were practically alike. No. 36 was less quiet than No. 34, which is very likely a partial explanation of the difference in gains.

In all six groups careful measurements were taken of every individual, to determine, if possible, if there are external indications of gaining capacity. These measurements included the following: width and length of head, size of neck, chest girth, middle girth, and rear girth, circumference of fore leg below knee, length from withers to hip bones, from last rib to hip, width through shoulder, width through chest behind shoulder, width of body through middle, through flank and hind quarter, depth of chest, depth of middle, depth through flank, width of loin, height from ground, pliability of skin, quality of hair, etc.

The 1909 Results.

The following year the same plan of keeping individual records and taking complete measurements was practiced with the three groups fed on different quantities of corn with alfalfa. These cattle were purchased in South Omaha as "hay-feds." They had been raised on the same ranch and none had been grain fed previous to their purchase for experimental feeding. Those showing any tendency to be wild were rejected. The cattle used were uniformly quiet and very quickly adapted themselves to stall feeding, after which the records were begun. In this experiment there was very little difference in the condition of the steers, but some were much smoother and more compact than others. Two of the low-set smooth kind were placed in each group and classed as good feeders; two that were heavier in bone, a little coarser throughout and more leggy were also placed in each group and classed as fair. The remaining two of each group were decidedly off type, being very leggy, angular in appearance, and in some instances more narrow in build. These were classed as common. This division in all the groups was merely arbitrary—a matter of general appearance at the beginning of the experiment. The records by group follow:

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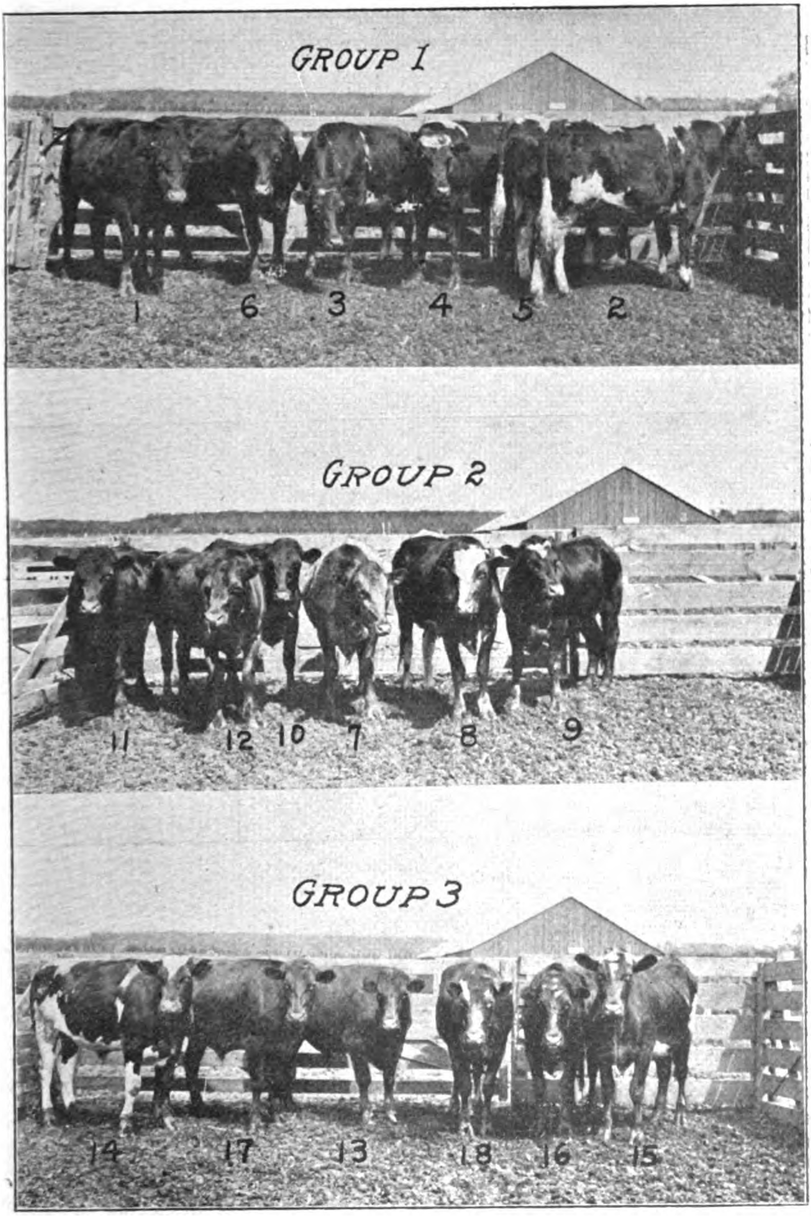

Steers in Experiment I as they appeared when marketed.

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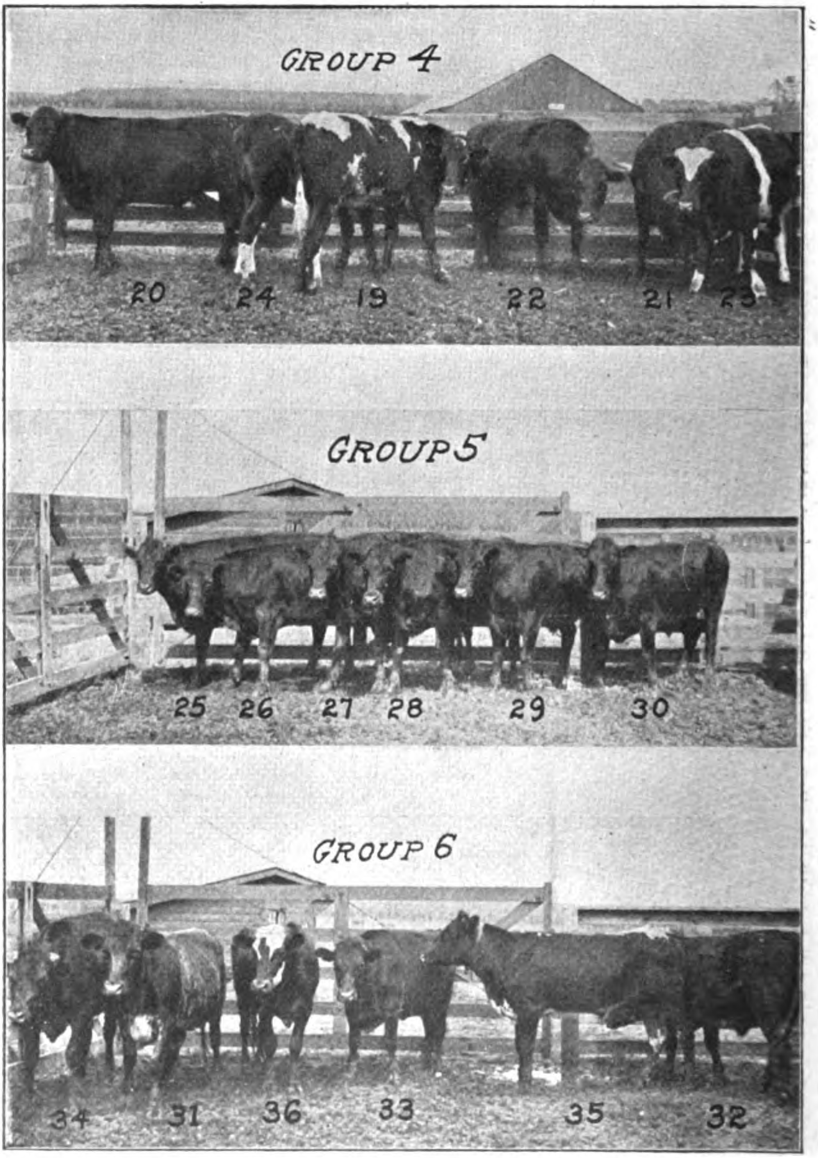
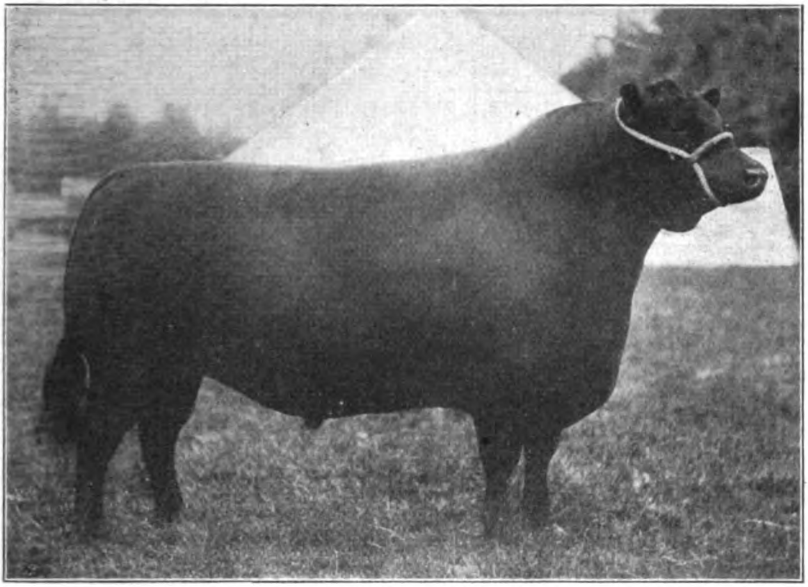
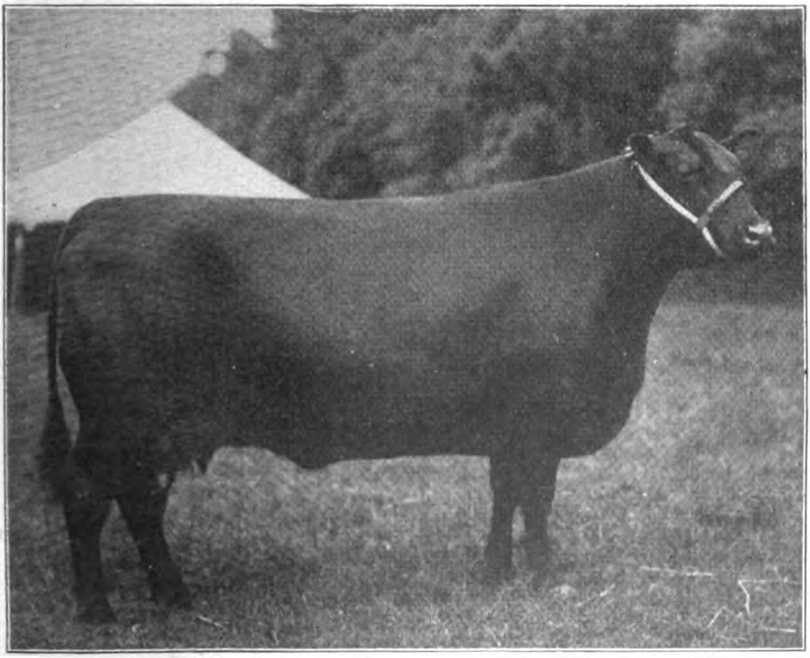


Steers in Experiment I as they appeared when marketed.



Aberdeen-Angus bull Wildgrave of Ballindalloch (27653). A notable prize-winner at English shows.



Aberdeen-Angus cow Bertha I of Swaylands (419391). Prominent as a prize-winner in England.

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TABLE X. *Record of each steer in Group I, January, 1909, to June, 1909—20 weeks. Ration—corn (light feed) and alfalfa hay.*

STEER NUMBER	1	2	3	4	5	6	Average of 1 and 2, good.	Average of 4 and 5, fair.	Average of 3 and 6, common.	Average of all six.
Initial weight of each steer, lbs.	954	934	767	944	800	837	944	872	802	878
Final weight, lbs.	1,230	1,230	1,055	1,305	1,115	1,125	1,230	1,210	1,090	1,177
Average gain of each steer per day lbs.	2.46	2.64	2.57	3.22	2.81	2.57	2.55	3.02	2.57	2.71
Amount of corn consumed by each steer per day, lbs.	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Amount of alfalfa consumed by each steer per day, lbs.	19.00	16.83	14.00	20.20	18.33	14.54	18.00	19.70	14.27	17.20
Grain consumed per pound of gain, lbs.	4.83	4.51	4.64	3.70	4.23	4.63	4.67	3.96	4.63	4.42
Roughage consumed per pound of gain, lbs.	7.70	6.40	5.44	6.27	6.51	5.66	7.05	6.39	5.55	6.34
Total food consumed per pound of gain, lbs.	12.54	10.91	10.11	9.97	10.75	10.28	11.72	10.36	10.19	10.76
Cost of food for 100 pounds of gain	$7 87	$7 06	$6 86	$6 15	$6 81	$6 93	$7 47	$6 48	$6 89	$6 95
Cost of each steer at the beginning of experiment, per 100 pounds	4 90	4 90	4 90	4 90	4 90	4 90	4 90	4 90	4 90	4 90
Net price received for each steer at the close of experiment	6 20	6 11	5 86	5 85	5 88	5 77	6 16	5 85	5 83	5 96
Net profit on each steer	$7 82	$8 51	$4 50	$7 92	$4 90	$3 96	$8 17	$6 41	$4 23	$6 57

TABLE XI. *Record of each steer in Group II, January, 1909, to June, 1909—20 weeks. Ration—corn (medium feed) and alfalfa.*

STEER NUMBER	7	8	9	10	11	12	**Average of 7 and 8, good.**	**Average of 9 and 12, fair.**	**Average of 10 and 11, common.**	**Average of all six.**
Initial weight of each steer, lbs.	893	877	867	885	920	797	885	832	908	878
Final weight, lbs.	1,230	1,200	1,190	1,155	1,250	1,130	1,215	1,160	1,208	1,193
Average gain of each steer per day, lbs.	3.00	2.89	2.89	2.41	2.95	2.98	2.95	2.94	2.68	2.86
Average amount of corn consumed by each steer per day, lbs.	15.63	15.63	15.63	15.63	15.63	15.63	15.63	15.63	15.63	15.63
Average amount af alfalfa consumed by each steer per day, lbs.	16.88	15.97	12.84	14.64	16.50	13.61	16.43	13.15	15.57	15.07
Grain consumed per pound of gain, lbs.	5.19	5.41	5.41	6.48	5.30	5.26	5.30	5.34	5.89	5.51
Roughage consumed per pound of gain, lbs.	5.61	5.53	4.44	6.07	5.60	4.58	5.57	4.51	5.84	5.30
Total food consumed per pound of gain, lbs.	10.80	10.96	9.87	12.56	10.87	9.82	10.88	9.84	11.72	10.81
Cost of food for 100 pounds of gain.	$7 58	$7 73	$7 35	$9 07	$7 63	$7 22	$7 65	$7 29	$8 85	$7 76
Initial cost of steers per 100 pounds	4 90	4 90	4 90	4 90	4 90	4 90	4 90	4 90	4 90	4 90
Net selling price of each steer per 100 pounds.	6 02	6 23	5 98	5 77	5 90	6 07	6 12	6 04	5 84	6 00
Net profit or loss on each steer.	Profit $4 94	Profit $9 21	Profit $4 92	Loss $1 19	Profit $3 51	Profit $5 48	Profit $7 06	Profit $5 20	Profit $1 12	Profit $4 46

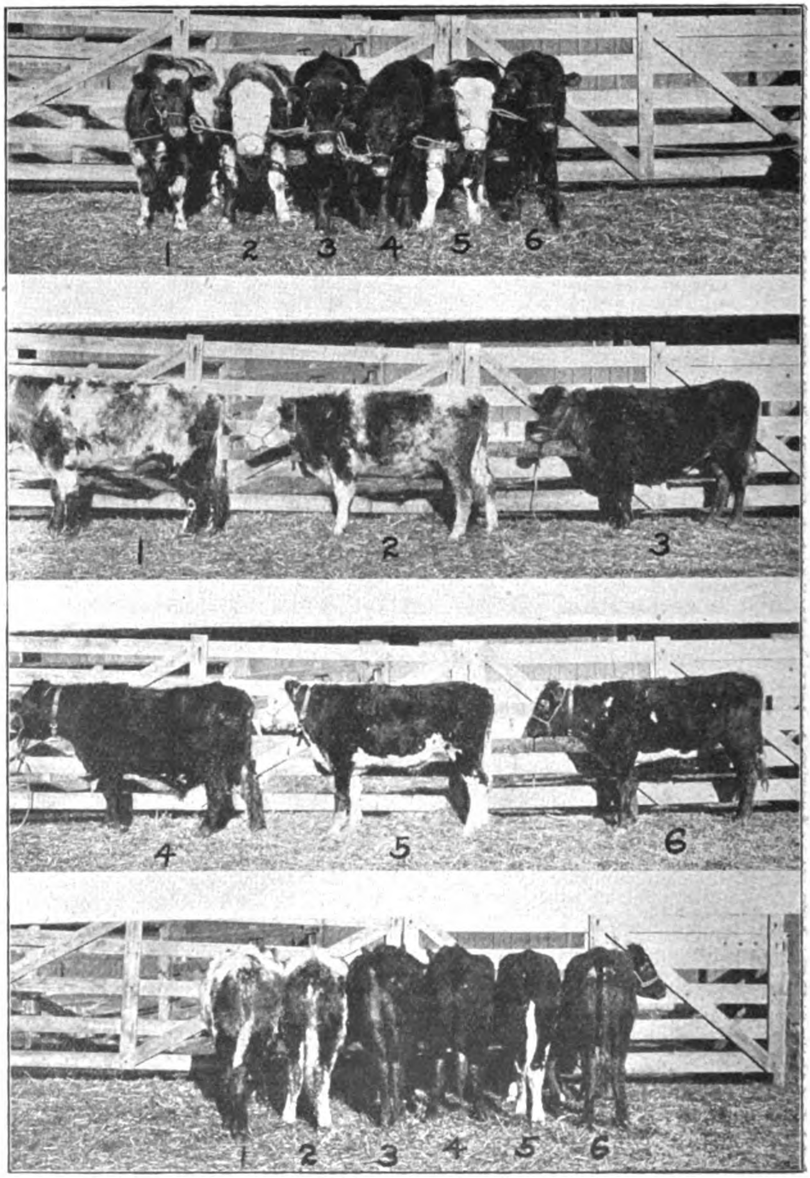
TABLE XII. *Record of each steer in Group III, January, 1909, to June, 1909—20 weeks. Ration—corn (heavy feed) and alfalfa hay.*

STEER NUMBER	13	14	15	16	17	18	Average of 15 and 18, good.	Average of 16 and 17, fair.	Average of 13 and 14, common.	Average of all six.
Initial weight of each steer, lbs.	793	858	937	897	854	850	894	876	826	865
Final weight, lbs.	1,135	1,130	1,225	1,170	1,210	1,155	1,190	1,190	1,183	1,171
Average gain of each steer per day, lbs.	3.05	2.43	2.57	2.44	3.18	2.72	2.65	2.81	2.74	2.73
Average amount of corn consumed by each steer per day, lbs.	18.31	18.97	18.70	18.74	18.90	19.14	18.93	18.82	18.64	18.80
Average amount of alfalfa consumed by each steer per day, lbs.	8.55	9.24	9.80	7.62	11.19	6.01	7.91	9.41	8.89	8.73
Grain consumed per pound of gain, lbs.	6.01	7.85	7.27	7.69	5.94	7.08	7.15	6.81	6.93	6.97
Roughage consumed per pound of gain, lbs.	2.81	3.80	3.81	3.13	3.52	2.21	3.01	3.33	3.33	3.21
Total food consumed per pound of gain, lbs.	8.82	11.65	11.08	10.75	9.46	9.24	10.16	10.14	10.26	10.18
Cost of food per 100 pounds of gain	$7 74	$9 69	$9 12	$9 82	$7 60	$8 30	$8 71	$8 46	$8 71	$8 62
Initial cost of steers per 100 pounds	4 90	4 90	4 90	4 90	4 90	4 90	4 90	4 90	4 90	4 90
Net selling price of each steer per 100 lbs.	5 94	5 97	6 13	5 92	6 04	6 11	6 12	5 98	5 95	6 02
Net profit or loss on each steer	Profit $3 24	Loss $0 91	Profit $2 93	Loss $0 13	Profit $4 26	Profit $3 62	Profit $3 27	Profit $2 06	Profit $0 67	Profit $2 00

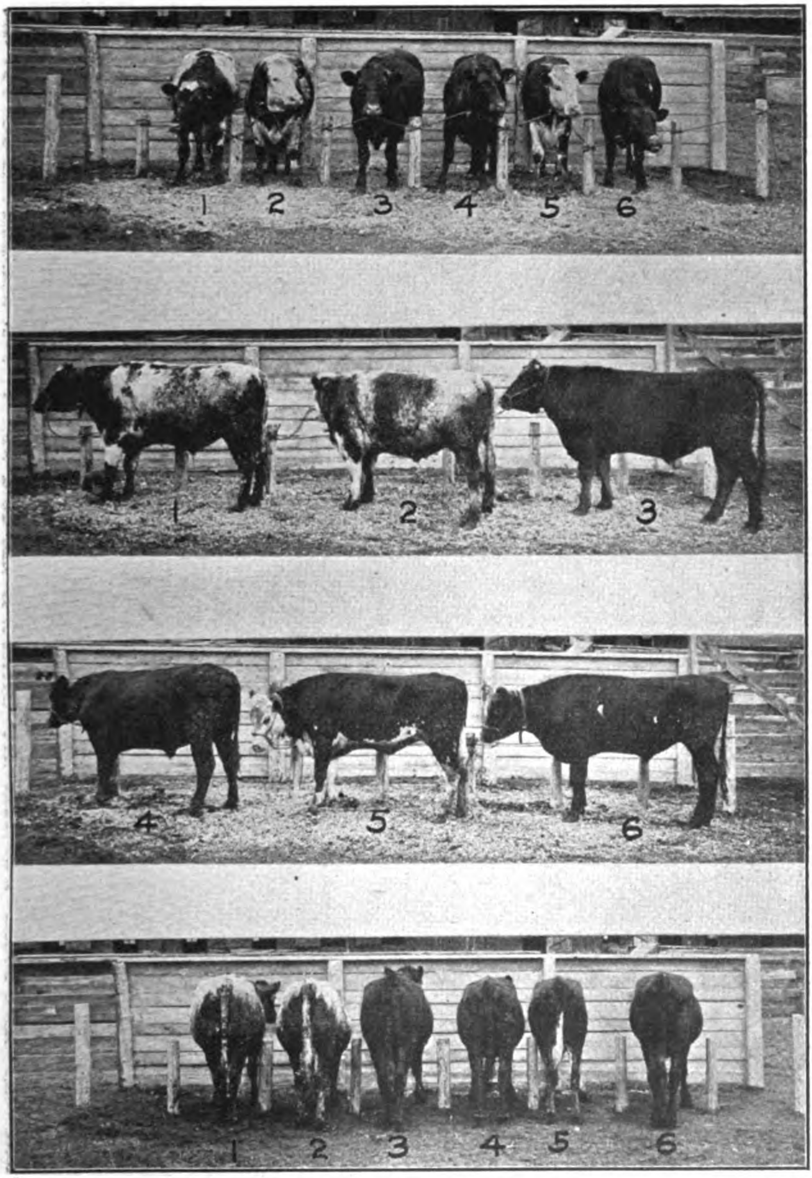
In group I of this experiment we see a variation in daily gains ranging from 2.46 pounds to 3.22 pounds, a difference of 0.76 pound. Each steer was fed 12 pounds of corn per day and all the alfalfa that he would consume. As a result there was shown a marked difference in capacity, ranging from 14 to 20.2 pounds of alfalfa, the largest amount being consumed by the heaviest gainer. The difference in gains, however, could not be attributed entirely to the roughage consumed, as the smallest gainer consumed next to the largest quantity of alfalfa. In this group the two steers classed as good sold for the highest price because they put on a little more flesh and were perhaps somewhat better in quality. Those called fair feeders made the largest gains. In this experiment the better steers show the most profit, because all were purchased together and at the same price. Had the good feeders been sold by themselves they would have cost more. Steer No. 4 of this group, classed as fair, was the most remarkable gainer of all steers in this experiment, making not only the highest average, 3.22 pounds per day, but this was done on the light grain ration, 12 pounds per day. He was not unusually large in heart girth—72.1 inches per thousand pounds, as compared with 73.5 for No. 1, the smallest gainer of this group. He was, however, 15.2 inches larger than No. 1 in middle girth and much larger than any other steer of the group, in fact the largest middle girth of the entire number in the experiment. By referring to his picture it will be observed that he shows great depth of body, which very likely explains his unusual capacity for roughage. It is significant, too, that No. 1, the smallest gainer of group I and next the smallest of the entire experiment, had the smallest middle girth of the entire number, weight considered. No. 1, however, was the best seller of the group and No. 4 next to the lowest.

In group II the daily gains varied from 2.41 pounds for No. 10 to 3 pounds for No. 7, though No. 12 gained practically as much as No. 7—2.98 pounds, a larger gain for the size of the steer. Here again it is significant that steers Nos. 7 and 12 had the largest middle girths of the group—No. 12, 95.7 inches, and No. 7, 90.8 inches, calculated on the basis of 1000 pounds average weight. No. 12 was also largest in heart girth, but No. 7 was smaller than No. 10, the lowest gainer. Steer No. 7 was a smooth, compact type, while No. 12 was rangy. No. 11, which gained practically as much as No. 12, 2.95 pounds, was a low-set steer, but heavy boned. No. 8—a grade Hereford, also a good gainer—was the smoothest and thickest steer in the experiment and sold for the highest price, making a net profit of $9.21. In this group we have also one of the poorest sellers in No. 10, and the least profitable of all in the experiment. He was a leggy, narrow steer and did not take on sufficient flesh to sell well. In this group the good steers made better gains on the average than the common, and much larger profits.

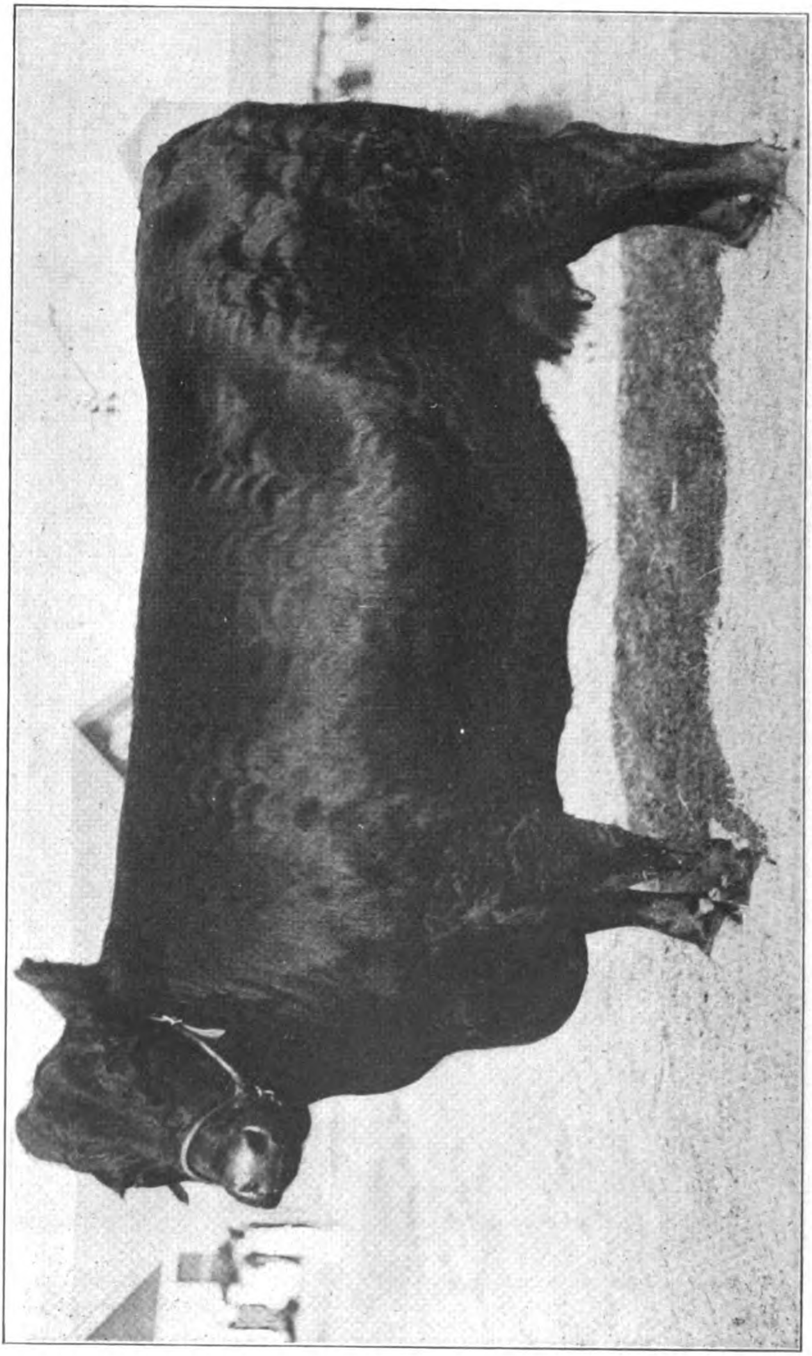
In group III the daily gains ranged from 2.44 pounds to 3.18 pounds, a difference of 0.74 pound. The two biggest gainers were largest in heart girth, and but one exceeded them in middle girth. Contrary to the results in group II, the good steers in this group made smaller daily gains than those called fair and common, and it would seem that so far as gains are concerned the smooth, compact steers had little or no advantage over the rougher, more rangy types.



Steers in Group I of Experiment II as they appeared when the records were begun.



Steers in Group I of Experiment II as they appeared at the close when marketed.



A prize-winning Galloway cow.

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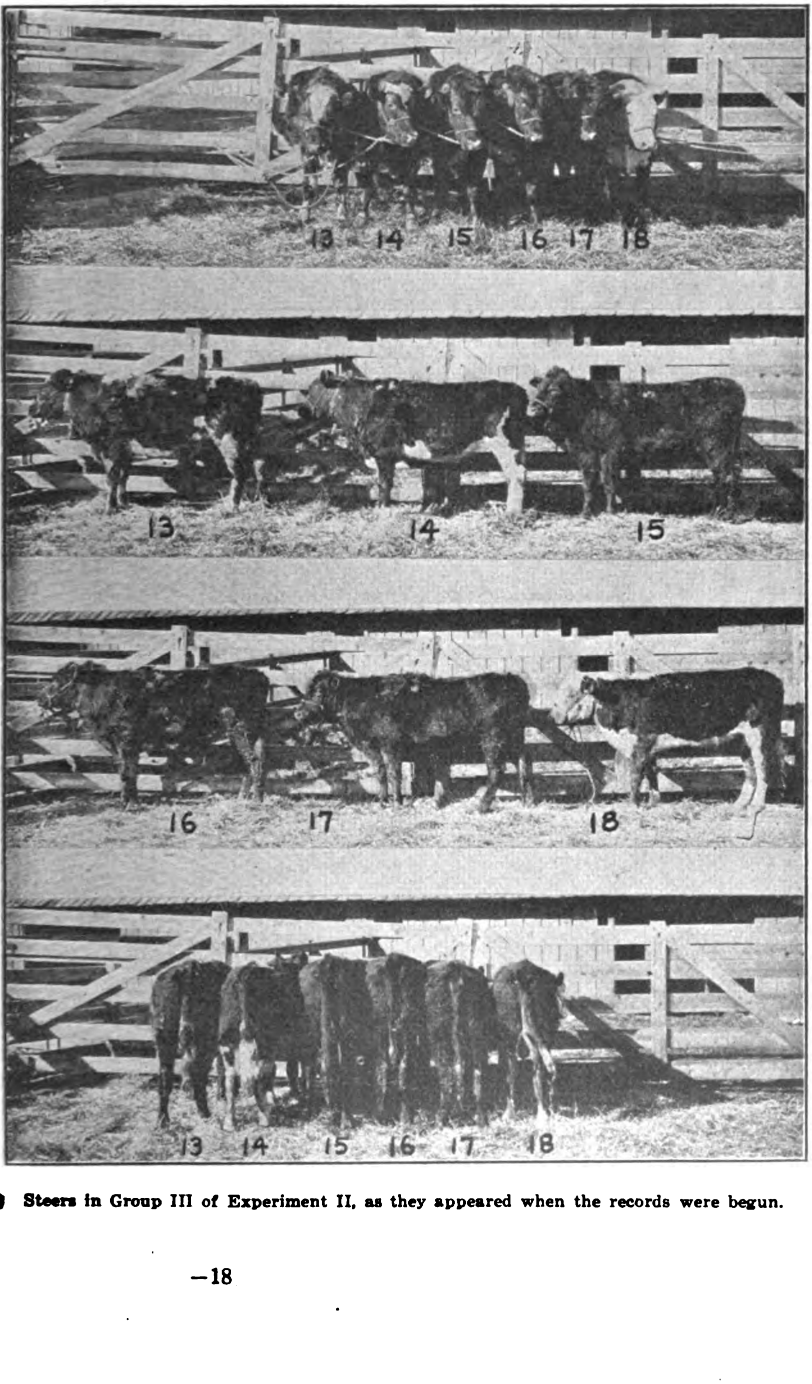
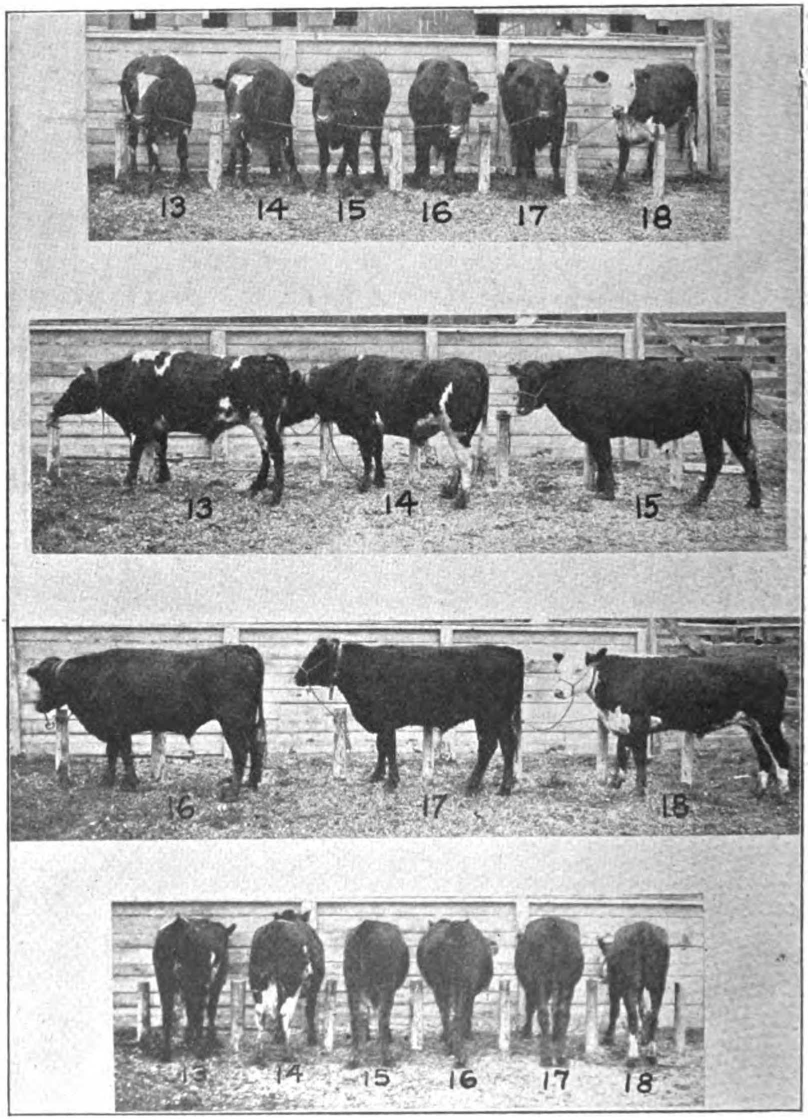
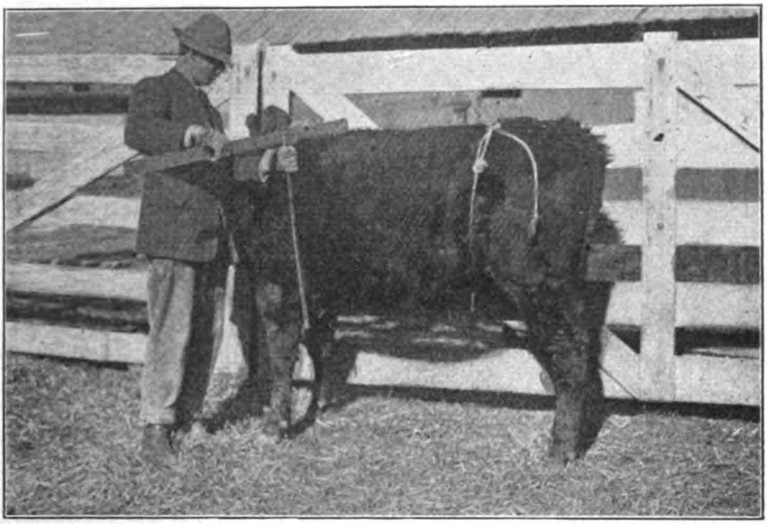
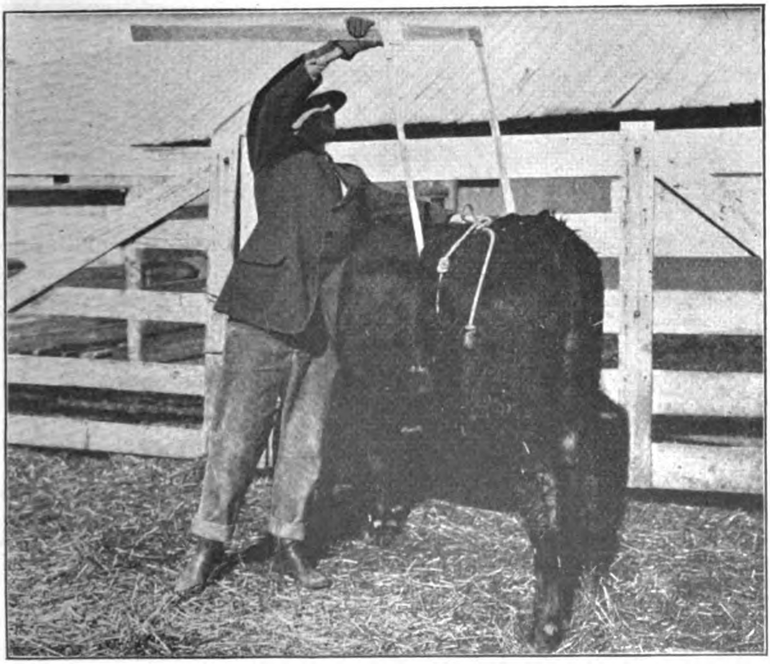


Steers in Group III of Experiment II, as they appeared when the records were begun.



Steers in Group III of Experiment II, as they appeared at the close when marketed.





Herdsman taking measurements.

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GENERAL DEDUCTIONS.

Very complete tabulation of all measurements of the individuals in both experiments have been made, but it seems best to withhold these from publication until still more evidence has been secured. Only a few very general deductions can be safely made at this time.

While the so-called better types of feeder steers—those more compactly built, smoother, etc.—did not seem to make larger gains, they did, with few exceptions, fatten more rapidly and sold for a higher price when finished. These types are therefore more profitable for the farmer who breeds the cattle he fattens, and they are also more profitable to the man who buys feeders if they can be had for a small advance in cost over the more common kinds. The results of the first experiment show very conclusively that at the present time the market makes too much difference between good and common feeders. Since the coarser, more rangy cattle gain as rapidly, it would seem that the difference in the price of feeders should be but little more than their difference as killers, which is determined more largely by condition than by quality. If in the first experiment the common cattle had cost 40 cents per hundred less than the good feeders rather than 80 cents, the profits per head would have been about the same. This should not be interpreted to be an encouragement to breed the common kind, but at existing market quotations it sometimes pays to buy that class to feed. The one who breeds and grows this inferior class of cattle is the real loser, for it costs but very little more to breed the better kind—simply the difference in the price of a good bull as compared with a so-called scrub. In the second experiment, where all steers were figured at the same price per pound at the beginning, the good types made a net profit of $6.17 per head as compared with $2.01 on the common kind. This difference of $4.16 per steer would make it profitable to pay $150 more for a good sire than a common one, even for one crop of calves.

SIZE OF HEART GIRTH AS AFFECTING GAINS.

It is still a matter of doubt in the mind of the writer as to how much the size of the heart girth affects gains. While there were several individual exceptions, the three best gainers of each of the six groups in experiment I showed on an average larger heart girths than the three poorest gainers of each group, excepting group III, in which the three poorest gainers measured 71.3 inches as compared with 69.7 inches for the average of the three best. This, however, may be explained by the fact that steer No. 12, a large-chested animal but very wild and nervous, made a low gain. In experiment II there were two groups that proved exceptions to this and there were a larger number of individuals with relatively small heart girth that made good gains. The size of rear girth seems to have less influence than the chest. Some of the best gainers were large in bone and some were small. In general it may be said that the best gainers were more closely coupled as determined by the distance from last rib to hip. Wide heads and thick necks seem to be also more in favor, although there were a number of large gainers that were long in the head. Width of head does, however, mean earlier maturity in most instances.

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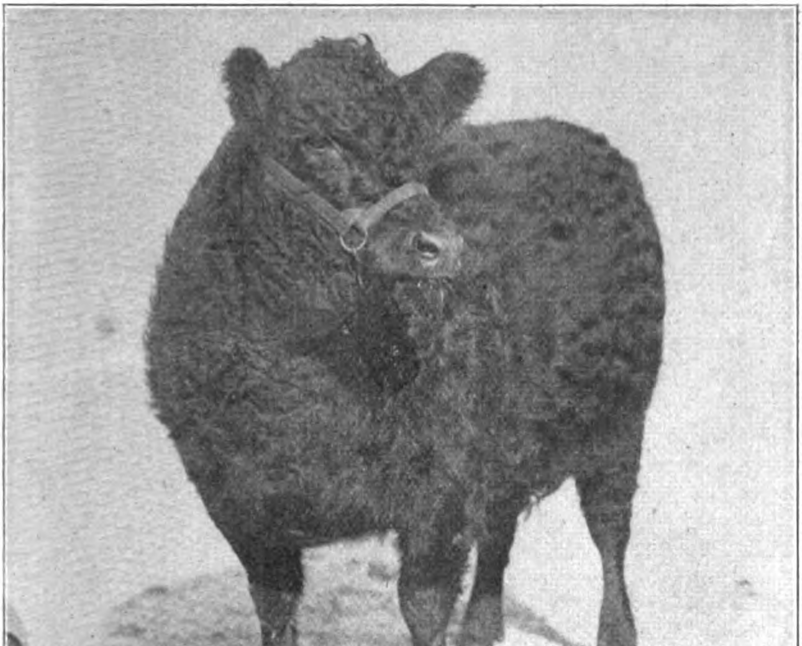
MIDDLE GIRTH AS A FACTOR.

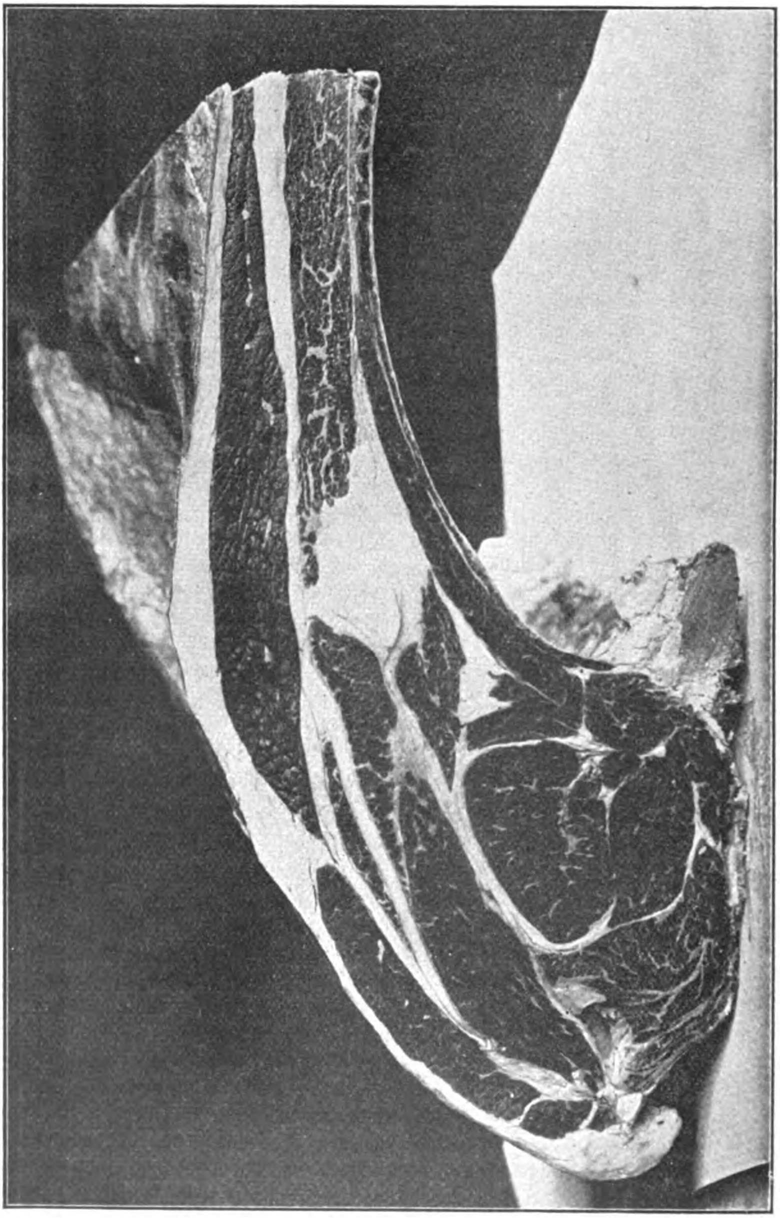
In all nine groups of both experiments the three best-gaining steers showed on the average larger middle girths than the three poorest gainers, and there were but few individual exceptions to this. It seems quite certain that steers showing greater depth and width of body in the middle, or region of the paunch, are larger gainers and more economical producers. It was also found that the larger number of the best gainers had the more pliable skin, but there were several exceptions to this.



Galloway heifer Myrtle of Avondale. A champion at the International Show, Chicago.

PLAN OF EXPERIMENT NOW IN PROGRESS.

Owing to the fact that condition, age of animal, nervousness, etc., influence results materially, this work is now being carried forward on a somewhat different plan. Forty-eight steer calves, all born the same month, are being reared on skim milk supplemented with grain, each fed separately and in the same manner, so that whatever difference is found in individuals can not be attributed to a difference of feed at any stage in the development of the animal from birth to maturity. There are widely contrasted types, some from well-bred sires and some from common stock. They are fed in stanchions, and it is thought this handling



Rib from grade Angus steer "Hinkle," yearling champion carcass (all breeds) International Live Stock Exposition, Chicago, December, 1909. Fed and exhibited by Department of Animal Husbandry, University of Nebraska. Ration: Corn, oats, bran, linseed meal, alfalfa, prairie hay and corn silage in winter, and pasture in summer.

from birth will eliminate any nervousness. Individual records of gains and measurements at different stages in growth will be kept until the calves are ready to sell, at the age of two years.

CONCLUSIONS FROM THESE EXPERIMENTS.

Part I—Foods.

(1) The results of two experiments show that a good quality of coarsely ground linseed meal (old process) has a feeding value slightly superior to old-process cottonseed meal, and that either of these feeds is better for supplementing corn for fattening cattle than wheat bran at current market values.

(2) The results of one experiment show a high feeding value for cold pressed cottonseed cake, which with corn and corn stover gave larger daily gains than any combination of foods used at this station.

(3) The results of two experiments show that excellent gains can be made by using corn stover as roughage, if the corn is properly supplemented with a so-called protein concentrate.

(4) The results of three experiments show that at current prices beef can be produced in Nebraska more economically by the use of alfalfa in connection with corn than by the use of protein concentrates—linseed meal, cottonseed meal, or bran, when the roughage consists of prairie hay.

(5) The results of three experiments indicate that when corn is from 35 to 50 cents per bushel and alfalfa not to exceed $7 per ton, considerably less than a full feed of corn, probably 14 to 18 pounds per day for a two-year-old steer, is more profitable than a full feed. If corn is worth 50 to 60 cents per bushel, something approaching a half feed of this grain (10 to 12 pounds per day) would seem most profitable if a few more weeks may be taken for the finishing process.

(6) The results of two experiments show that the groups fed liberally on alfalfa gave a better quality of meat as indicated by color, marbling, etc.

Part II—Individual Differences.

(7) With respect to the animal, two experiments show a great variation in the capacity of individuals to make gains under similar conditions, and this variation, though apparently not due to the quality of the cattle, is, however, influenced more or less by condition of flesh at the beginning. It is not unusual for one steer to make one-fifth larger gains than another on the same feed—both in the same condition of flesh at the beginning—and with correspondingly larger profits.

(8) While in these experiments the smooth, more compact types of cattle did not necessarily make larger gains than the rougher, more rangy types, they did fatten more rapidly, and sold for a higher price per pound at the close of an equal period of feeding.

(9) Common feeders may sometimes be purchased at a price that will make them more profitable to the feeder, but they are less profitable to the grower or to the farmer who grows and fattens his cattle.

(10) Cattle that show a nervous disposition seem handicapped in making gains under confinement.

(11) Nearly all of the largest gainers of both experiments were steers which measured large middle girths at the beginning of the feed-

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ing period, and it would seem that size of middle girth is an important factor in determining future gains.

(12) In these experiments the size of bone did not seem to bear any definite relationship to rate of gain, some of the best gainers being large in bone and some relatively small; nor was there any definite relationship between heart girth and rate of gain, though the large majority of the best doers of the several groups were large in heart girth. With but few exceptions, the best gainers showed more pliability and softness of skin.

WINTER STEER-FEEDING.

From Indiana (Purdue) Experiment Station Bulletin No. 168, by J. H. SKINNER, F. G. KING, and H. P. RUSK.

SUMMARY.

Part I.

1. Corn silage, in all rations where it was fed, proved a more economical and more profitable roughage than clover hay alone for fattening cattle.
2. The addition of corn silage to a ration of shelled corn, cottonseed meal and clover hay decreased the consumption of shelled corn in amounts closely approximating the grain content of the silage in the ration.
3. The addition of corn silage to a ration of shelled corn, cottonseed meal and clover hay increased the rate and decreased the cost of gain, and effected equally as good finish on the cattle.
4. The addition of corn silage to a ration of shelled corn, cottonseed meal and clover hay increased the profits per steer in amounts closely corresponding to the saving in cost of gains.
5. The substitution of corn silage for clover hay with grain ration of corn and cottonseed meal did not affect the rate of gain, but did greatly reduce the cost of gain.
6. Corn silage alone as roughage with a grain ration of shelled corn and cottonseed meal gave slightly less finish than clover hay alone as roughage, but the cost of gains was enough less to effect a much larger profit where silage was the only roughage fed.
7. The more nearly corn silage replaced the clover hay in the ration the cheaper the gain, but the entire elimination of clover hay from the ration was accompanied by slightly less finish on the cattle.
8. Under prevailing market conditions, the larger the proportion of corn silage in the roughage in the early part of the fattening period the cheaper were the gains.
9. In order to induce sufficient grain consumption to insure satisfactory gains it was necessary to limit the amount of silage fed during the latter part of the feeding period.
10. Corn silage in the ration produced relatively more rapid improvement in the condition of the cattle during the early part of the fattening period than did clover hay alone as roughage.
11. The consumption of frozen silage scoured the cattle.

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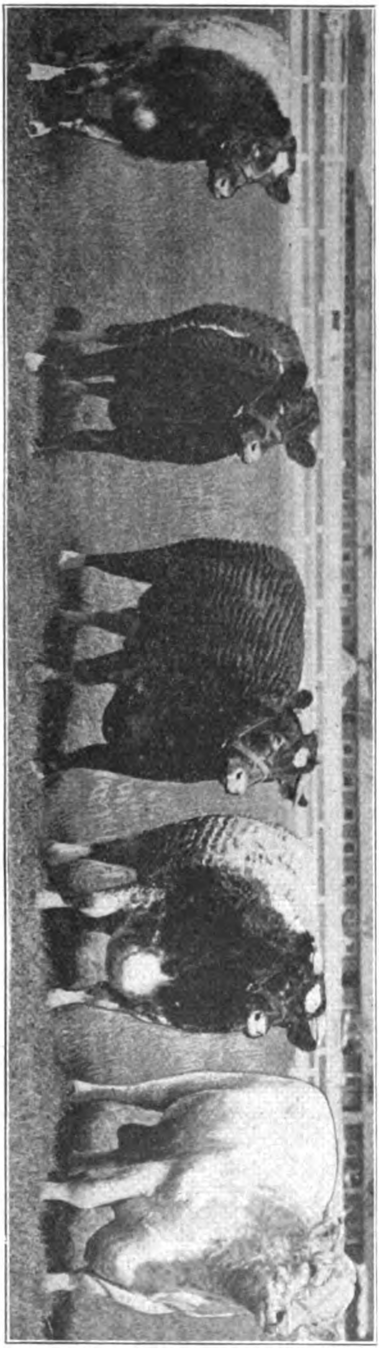

Short-horns at their best.

Part II.

12. The use of 2.5 pounds of cottonseed meal per 1000 pounds live weight of cattle in a ration of shelled corn, cottonseed meal, clover hay and corn silage made more rapid gains and effected a higher finish on the cattle than where 1.25 pounds per 1000 live weight were consumed.

13. With corn above 40 cents per bushel, the cost of gain was less where the larger amount of cottonseed meal was fed with shelled corn, clover hay and corn silage.

14. The ration of shelled corn, cottonseed meal, clover hay and corn silage returned the largest profits where the cottonseed meal was fed in the proportion of 2.5 pounds daily per 1000 pounds live weight.

15. The consumption of 2.5 pounds of cottonseed meal daily per 1000 pounds live weight in a ration of shelled corn, cottonseed meal and clover hay produced gains at a greater cost than when half that amount of cottonseed meal was consumed.

16. The consumption of the larger amount of cottonseed meal, where shelled corn, cottonseed meal and clover hay were fed, produced a better finish on the cattle.

17. The profit per steer was less in 1909-'10 where 2.5 pounds of cottonseed meal were consumed daily per 1000 pounds live weight in connection with shelled corn and clover hay, and in 1910-'11 the profits were in favor of the larger amount of nitrogenous concentrate.

Part III.

18. The consumption of roughage by the heavy, fleshy feeders was relatively less, and the consumption of grain relatively greater than by lighter, thinner cattle.

19. The *short-fed* cattle in the trials of 1909-'10 made more rapid gains than the *long-fed* cattle.

20. The heavier and fleshier the cattle at the beginning of the feeding period the more expensive were the gains.

21. Corn silage and clover hay proved efficient for carrying heavy, fleshy feeders for the first part of the feeding period.

22. Cattle in the trial of 1910-'11, carried for sixty days on clover hay and corn silage and then *short-fed,* made less gain and returned a smaller profit than *long-fed* cattle.

INTRODUCTION.

The past few years have witnessed a great awakening of interest in agricultural problems of all kinds, and especially in those relating to the conservation of soil fertility and permanent systems of farming. The study of these problems has resulted in an increasing tendency among the most progressive farmers to market a part, at least, of their crops through live stock and thus retain as large a per cent of the fertility as possible upon the farm. This tendency brought them early face to face with the problem of developing some efficient method of utilizing, through live stock, the fodder and other roughages produced. The result is a more general appreciation of the importance of the part which cattle feeding, as a means of utilizing the roughage, must take in future systems of farm management.

One of the greatest losses on the farm is due to the lack of proper

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utilization of roughage incidental to grain production. It is impossible to produce grain without also producing large amounts of roughage. Since cattle are preëminently the most satisfactory animals to consume large quantities of roughage, the solution of the roughage problem lies largely with this class of stock, and with it rests the real value of the roughage grown on the farm. Cattle feeding is coming more and more to be considered as a means of marketing grain, conserving soil fertility and completely utilizing the roughage produced on the farm rather than a means of commercial speculation. The work of the experiment station with beef cattle has been conducted with the intention of meeting the demands of practical feeders for information regarding the most efficient methods of feeding the crops produced on the farm, and especially the utilization of the various kinds of roughage.

MARKET CONDITIONS. The conditions of the live-stock market during the time covered by the feeding trials reported in this bulletin have been rather unusual. At the outset of the 1909-'10 season feeders were confronted with the problem of feeding high-priced corn to high-priced steers. The butchers were competing with the country buyers for the fleshier kinds, and the prices of feeders were forced to a very high level. Indiana pastures, too, were short, and the native feeders were not only high priced but thin. These conditions, coupled with the scarcity of clover hay, made the prospect rather gloomy, but owing to the very strong demand for all kinds of meat which prevailed during the winter of 1909-'10 and the spring following, fat cattle marketed during that period sold at a good margin over cost of feeders, and where fed judiciously returned a large profit on the investment. The season of 1910-'11 began under somewhat different conditions. The unusually large corn crop in 1910 and the abundance of feed throughout the great feeding sections of the country created such a demand for all classes of feeding stock that the fall market for feeding cattle was raised to the highest point for many years. This was followed in the spring by a dull market for fat stock and resulted in a most disastrous year for feeders.

Object.

The object of the trials reported in this bulletin was to obtain additional information on the value of corn silage as a roughage for fattening steers, and data on the best methods of utilizing the roughage produced on the farm. The work, however, was not confined entirely to a direct comparison of roughages, but also involved the study of the influence of the addition of supplementary feeds, such as cottonseed meal, to the ration, and to a comparison of the relative profits from long and short feeding periods.

Shelter, Feed Lots and Water Supply.

The conditions surrounding the cattle were no better than those of the average feed lot. Each lot of ten steers was fed in a yard 40 x 50 feet, with an open shed 12 x 40 facing east, on the west side of each yard. The yards were covered with cinders and gravel. This did not prove entirely satisfactory because it did not prevent the lots from getting very muddy and sloppy. This condition resulted in some trouble from cinders getting into the cleft of the steers' hoofs and causing lameness.

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The sheds were kept well bedded, so that the cattle had a comfortable place to lie down. However, no bedding was used in the lots.

The water was supplied from the West Lafayette waterworks, in galvanized-iron tanks set in the open lot and surrounded by five or six inches of manure, held in place by a wooden jacket. The water was further protected by tank covers, which were closed during the night in cold weather. No attempt was made to heat the water, and considerable trouble was experienced with ice in the troughs in extremely cold weather.

Weights.

The averages of individual weights taken on three consecutive days at the beginning and close of the experiments were used as initial and final weights. The identity of each steer was known by means of a numbered tag on a strap fastened around the neck of each steer. Individual weights were taken at the end of every thirty-day period, and lot weights at the end of every ten-day period, in order to obtain proportions of feeds desired in the rations and facilitate keeping records of feed consumed and gains made. Weights were taken in the morning, beginning at nine o'clock, 1909-'10, and eight o'clock in 1910-'11. No attempt was made to withhold the water before weighing in 1909-'10. The tanks were closed at six o'clock in the evening before weighing in 1910-'11.

Method of Feeding.

The method of feeding was the same in all lots in both trials reported in this bulletin. Grain was fed at 6 A. M. and 4:30 P. M., in troughs in the open lot. Shelled corn was placed in the trough, the cottonseed meal poured upon it and both thoroughly mixed by hand. After the cattle had cleaned up the grain ration, which usually required from a half to three-quarters of an hour, the roughage was fed. In lots 1 and 5 clover hay was fed in the morning and silage at night; in lots 2 and 6 clover hay without other roughage was fed both morning and night; in lot 3 silage without other roughage was fed both morning and night; while in lot 4 silage was fed both morning and night, and in addition clover hay was fed in the morning. Lot 7 in 1909-'10 was fed the same as lot 3. Lot 8 in 1909-'10 and lot 7 in 1910-'11 were fed the same as lot 4. It was the intention to have all silage cleaned up within two hours and all clover before the next time to feed clover. Salt was supplied at regular intervals.

Description of the Cattle.

The cattle used in the experiment during the winter of 1909-'10 were two-year-old steers of mixed breeding. About three-fourths of the number used were black cattle showing a preponderance of Angus blood; the other one-fourth were red cattle showing either Short-horn or Hereford ancestry. About one-half of these cattle were purchased in Lawrence county, Indiana; they were native Indiana cattle. The other half were purchased in Montgomery county, Indiana; they were all black, and had been purchased in Chicago in the spring of 1909, and pastured in Montgomery county during the summer and fall. Nothing definite is known of their treatment before they were purchased in Chicago, but a few of them were branded, and this would indicate that at least that part of

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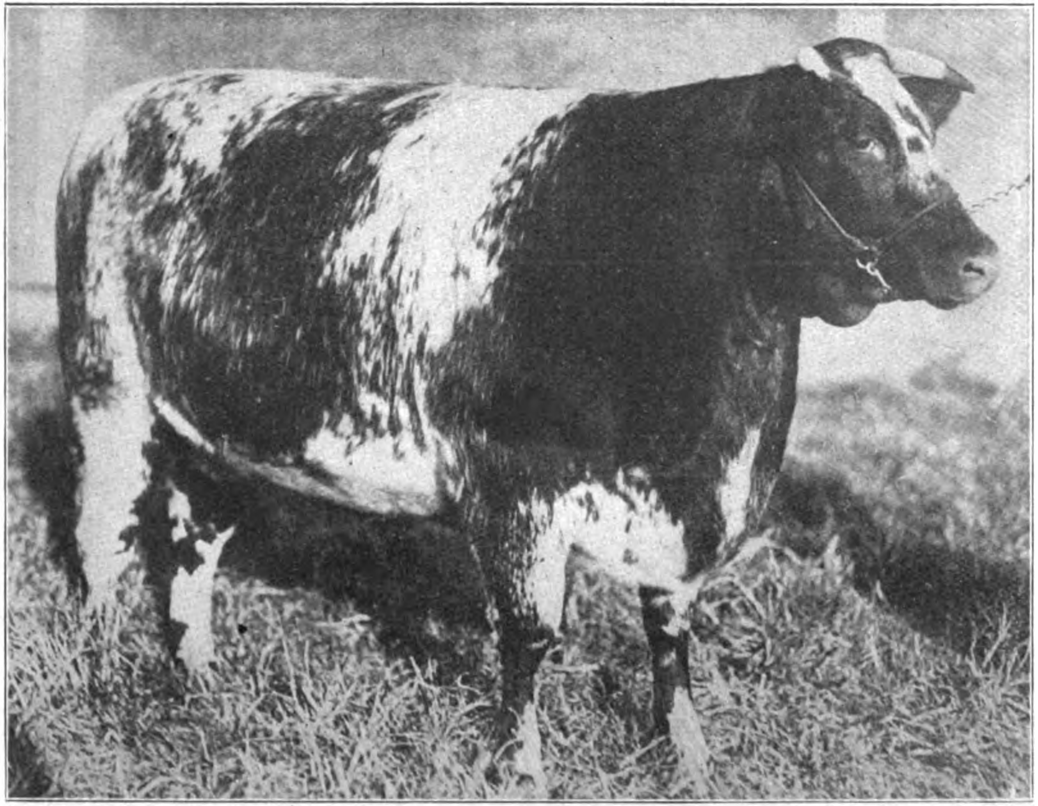

A champion roan Short-horn heifer.

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them came from the western ranges. There were only a few choice feeders in the bunch and there were several that would not grade above medium. All of these cattle were in thin condition when they reached the University farm. Fifteen of the heaviest and fleshiest of the number were selected for the "short-fed" lot, which was designated as lot 7. The average weight of these steers was 1055 pounds. Six of them were black and showed evidence of Angus ancestry, six showed short-horn breeding and three Hereford breeding. They were plain with a little tendency toward legginess, and aside from being heavier and fleshier than the steers in the other lots they apparently possessed less quality. Sixty other steers, averaging 893 pounds per steer, were divided into lots of ten steers each, care being taken to have all lots as nearly equal as possible in regard to thrift, weight, condition, breeding and quality. These six lots averaged eight blacks and two reds to the lot.

These cattle were valued at $4.65 per hundred pounds for lots 1, 2, 3, 4, 5 and 6, and $5 for lot 7. Market quotations for feeding cattle for the week were as follows:

Selected, strong weight, fleshy feeders,	$5 00 to $5 30
Good feeders, 900 to 1000 pounds.....	4 25 to 4 85

Fifteen light, thin, medium steers from the same drove were wintered on blue-grass pasture and corn-stalk fields, and then placed in a short feeding test on March 17, 1910.

The cattle used in the winter of 1910-'11 were two- and three-year-old steers of mixed breeding, but of somewhat better quality than those used the previous year. Of the seventy steers, twenty-four were black, thirty-four red, and twelve red with white faces, denoting a preponderance of Angus, Short-horn, and Hereford blood, respectively. They had been wintered and grazed the previous winter and summer in Lawrence county, Indiana, and were natives of that region. There were only a few choice feeders in the lot, and very few that would not grade as "good, fleshy feeders." All lots were divided equally according to size, breed, condition and quality. These cattle were valued at $5 per hundred pounds on November 19, 1910. Market quotations for feeding cattle for the week were as follows:

Selected, fleshy feeders..............	$5 25 to $5 65
Good feeders	4 85 to 5 25

Although these steers carried enough flesh for choice feeders, lack of quality would not permit them to grade above "good."

Method of Valuing Cattle.

At the beginning of the experiment of 1909-'10, Messrs. J. T. Alexander, of the firm of Alexander, Ward & Conover, Chicago, and J. H. Moffitt, of the firm of Valodin, Beeler, Moffitt & Co., and Mr. Lichtenberg, of Indianapolis, and in 1910-'11 Messrs. J. T. Alexander and Allen Beeler, visited the feed lots and placed values upon each lot of cattle, upon the basis of the Chicago and Indianapolis markets, which were taken as the initial values. At the close of the experiment of 1909-'10 Messrs. Alexander and Beeler, and at the close of the experiment of 1910-'11 Messrs. Conover and Beeler, visited the feed lots and placed the values upon the

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cattle on the basis of the Chicago market. In order to cover expenses of shipping, 40 cents per hundred pounds was deducted from these values of the fat cattle. All financial statements are based on market prices for feeding cattle, and Chicago values for finished cattle, less 40 cents per hundred.

Quality of Feeds.

The rations fed during the winter of 1909-'10 and 1910-'11 were composed of various combinations of part or all of the following feeds: shelled corn, cottonseed meal, clover hay, and corn silage. The corn used was of good quality and would grade as No. 2, except during the latter part of March and the first part of April, 1910, there were some rotten kernels and a musty smell to the corn fed. The cottonseed meal was of "choice" grade, guaranteed to contain 41 per cent crude protein and 8 per cent fat. The clover hay used in 1909-'10 was of only medium quality. The clover crop of 1909 was very short, and it was very difficult to secure first-class hay. Fully one-third of the bales contained some musty hay, and none of them were entirely free from timothy or other impurities. The clover hay fed in 1910-'11 was pure and of good quality, only a small part of it being of inferior quality, and it was readily eaten by the cattle.

The silage was produced from corn raised on the college farm, making about 60 bushels per acre in 1909 and about 65 bushels per acre in 1910, the yield of silage being approximately 12 and 13 tons per acre, respectively. The corn was well matured; about two-thirds of the husks and one-third of the blades were brown when the silos were filled.

Prices of Feeds.

The prices of feeds are based on the actual prices at the time the experiments were conducted. In 1909-'10, the average price of corn, in Lafayette, was as follows: first month, 49.9 cents; second month, 55.7 cents; third month, 56.7 cents; fourth month, 53.7 cents; fifth month, 5.19 cents; and last 10 days, 50.2 cents per bushel. In 1910-'11, the average price of corn was as follows: first month, 36.1 cents; second month, 37 cents; third month, 37.8 cents; fourth month, 36.9 cents; fifth month, 39.3 cents per bushel. Cottonseed meal is valued at $33 per ton in 1909-'10 and $30 per ton in 1910-'11. These values are slightly higher than was paid by the station for this feed in carload lots. Clover hay in all instances is valued at $10 per ton. Corn silage is valued at $3.50 per ton in 1909-'10 and $3 per ton in 1910-'11. This allows 75 cents per ton for harvesting, 25 cents per ton for the stover contained in a ton of silage, and 50 and 40 cents per bushel for the corn, according to whether the silage is valued at $3.50 or $3 per ton.

For purposes of comparison in the statements on the cost of gain, corn is valued at two arbitrary prices, 50 and 40 cents per bushel. In these comparisons cottonseed meal is valued at $30 per ton, clover hay at $10 per ton, corn silage at $3.50 per ton when corn is 50 cents and at $3 when corn is 40 cents per bushel. In all financial statements and summaries the actual value of the feeds is taken.

Hogs.

Enough hogs were kept behind the cattle to thoroughly work over the droppings. The number in each lot varied slightly according to the condition of the yards, but usually there were five hogs in the first three lots

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and ten in the next three, twelve in lot 7 and fifteen in lot 8 of 1909-'10, and there were eight hogs in each lot of 1910-'11, except in lot 7 for the first two months, when there were only seven hogs. No grain was fed the hogs in lots 1, 2 and 3 of 1909-'10 after the cattle were on full feed, and none of the lots of 1910-'11 received any grain except lot 7, where grain was fed before the cattle were placed on full feed. The hogs of lots 4, 5, 6, 7 and 8 of 1909-'10 received corn in addition to the droppings. When hogs in any lot became finished they were removed and others put in their places. There were two such drafts before the close of the experiment in 1909-'10, and one in 1910-'11.

PART I.—CORN SILAGE AND CLOVER HAY AS ROUGHAGE FOR FATTENING STEERS.

Part I of this bulletin is a report and discussion of the results obtained in trials conducted in 1909-'10 and in 1910-'11 to determine the relative value and the most economical combination of corn silage and clover hay for fattening steers. There is produced upon the farm large quantities of rough feeds that do not bring on the market prices to justify the removal of such quantities of plant food as of necessity accompanies the sale of such products. Therefore, one of the greatest problems to be solved in successful farm management is the disposal of the roughage produced on the farm in such a way as to secure the feeding value and at the same time conserve the plant food therein contained. The use and value of clover hay is pretty well recognized and understood, but the use and value of the corn stalk is neither understood nor appreciated. It has long been known that the stalks contain a very large per cent of the food nutrients of the corn plant. When harvested to preserve the grain only, the stalks, either standing or as corn stover, while containing the food nutrients, have them locked in such a way with woody fiber that they are not readily available for animals. The woody parts are not only unpalatable, but when eaten require so much energy in digestion that a large part of their value is lost. When harvested by putting the entire plant into the silo, the plant passes through a process of fermentation that leaves the hard parts of the stalk soft and palatable, and the general effect of summer grass is secured in winter by feeding the corn silage. When fed in the form of silage the entire corn plant is consumed.

The trials reported herein are a continuation of and are based upon previous investigations at this station, and reported in bulletins Nos. 129 and 136. The trials reported have shown that the addition of corn silage to a ration of shelled corn and clover hay for fattening cattle does not materially affect the profit. They have also shown that the addition of cottonseed meal to a ration, either with or without silage, is profitable. However, when cottonseed meal was fed, the addition of corn silage decreased the cost of making gains by amounts varying from 50 cents to $2 per hundred, and made as good or better finish on the cattle than when only dry roughage was used. The exceedingly favorable showing of corn silage led to a continuation of the investigation. It must be understood, however, that it is not the purpose of these trials to find a substitute for clover hay for cattle feeding, but rather to discover the most satisfactory method of utilizing, through the medium of fattening cattle, the roughage produced by the corn plant. Clover and corn must continue as the prin-

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cipal crops in the corn belt, and the roughage from both sources should be used in such combination that the greatest good will be secured from them. With this object in view, the following comparisons of silage and clover, alone and in combination, were made in a two-year series. Because of the fact that earlier trials had shown the economy of using cottonseed meal in a ration, and more especially in a ration containing corn silage, all the rations in this test received shelled corn, and cottonseed meal in the proportion of 2.5 pounds daily per 1000 pounds live weight of cattle. The only variable factor between the four rations was the amount of corn silage or clover hay fed.

The rations fed were as follows:

Lot 1. Shelled corn, cottonseed meal 2.5 pounds per 1000 pounds live weight, corn silage (evening), clover hay (morning).

Lot 2. Shelled corn, cottonseed meal 2.5 pounds per 1000 pounds live weight, clover hay.

TABLE I. *Showing average amount of feed consumed daily per head by fattening steers, winter 1909-'10.*

Date of expriment Length of experiment	November 17, 1909—April 26, 1910. (160 days.)			
	Lot 1.	Lot 2.	Lot 3.	Lot 4.
RATION.	Shelled corn, cottonseed meal, clover hay (morning), corn silage (evening).	Shelled corn, cottonseed meal, clover hay.	Shelled corn, cottonseed meal, corn silage.	Shelled corn, cottonseed meal, clover hay (morning), corn silage (morning and even'g).
First month:	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*
Shelled corn	10.60	10.60	10.60	10.60
Cottonseed meal	1.79	1.79	1.79	1.79
Clover hay	9.20	14.77	....	5.29
Corn silage	15.48	....	31.07	31.07
Second month:				
Shelled corn	13.48	13.48	13.48	13.48
Cottonseed meal	2.47	2.40	2.40	2.47
Clover hay	8.13	12.01	....	4.61
Corn silage	16.08	....	31.74	31.88
Third month:				
Shelled corn	14.95	15.02	14.70	14.70
Cottonseed meal	2.68	2.48	2.52	2.68
Clover hay	8.00	12.00	....	4.80
Corn silage	15.00	....	30.00	30.00
Fourth month:				
Shelled corn	17.53	18.48	15.37	16.08
Cottonseed meal	2.97	2.80	2.87	2.97
Clover hay	7.29	10.99	....	3.19
Corn silage	14.17	....	28.23	28.25
Fifth month:				
Shelled corn	18.98	19.95	13.93	16.92
Cottonseed meal	3.00	2.96	2.50	2.88
Clover hay	6.31	9.79	....	3.73
Corn silage	10.87	....	21.48	21.53
Last 10 days:				
Shelled corn	18.55	19.90	13.76	15.90
Cottonseed meal	3.00	3.00	2.73	3.00
Clover hay	5.85	9.70	....	6.00
Corn silage	8.00	....	15.20	16.00
Average of entire period:				
Shelled corn	15.33	15.78	13.62	14.44
Cottonseed meal	2 61	2.52	2.44	2.58
Clover hay	7.67	11.77	....	4.43
Corn Silage	13.93	....	27.67	27.76

TABLE I—Concluded. *Showing average amount of feed consumed daily per head by fattening steers, winter 1910-'11.*

Date of experiment. Length of experiment.	November 18, 1910—April 17, 1911. (150 days.)			
	Lot 1.	Lot 2.	Lot 3.	Lot 4.
RATION.	Shelled corn, cottonseed meal, clover hay (morning), corn silage (evening).	Shelled corn, cottonseed meal, clover hay.	Shelled corn, cottonseed meal, corn silage.	Shelled corn, cottonseed meal, clover hay (morning), corn silage (morning and even'g).
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
First month:				
Shelled corn	13.13	13.33	11.22	10.35
Cottonseed meal	1.86	1.88	1.88	1.79
Clover hay	9.17	15.82	....	5.65
Corn silage	20.53	....	42.53	39.07
Second month:				
Shelled corn	18.05	20.52	14.05	13.05
Cottonseed meal	2.97	2.87	3.04	2.97
Clover hay	4.99	9.73	....	4.38
Corn silage	21.00	....	41.38	30.00
Third month:				
Shelled corn	19.25	22.18	14.94	15.25
Cottonseed meal	3.27	3.13	3.28	3.20
Clover hay	5.00	10.00	....	4.00
Corn silage	21.00	....	40.00	30.00
Fourth month:				
Shelled corn	20.00	23.00	15.28	16.21
Cottonseed meal	3.43	3.35	3.43	3.41
Clover hay	5.00	10.00	....	4.30
Corn silage	21.00	....	37.53	29.19
Fifth month:				
Shelled corn	20.88	23.00	17.93	17.03
Cottonseed meal	3.68	3.57	3.58	3.64
Clover hay	5.00	9.50	....	4.15
Corn silage	20.83	....	29.40	26.81
Average of entire period:				
Shelled corn	18.26	20.41	14.68	14.38
Cottonseed meal	3.04	2.96	3.04	3.00
Clover hay	5.83	11.01	....	4.50
Corn silage	20.77	....	38.17	31.00

Lot 3. Shelled corn, cottonseed meal 2.5 pounds per 1000 pounds live weight, corn silage.

Lot 4. Shelled corn, cottonseed meal 2.5 pounds per 1000 pounds live weight, corn silage twice daily, clover hay.

A comparison of lots 1 and 2 shows the effect of adding a limited amount of corn silage to a ration of shelled corn, cottonseed meal, and clover hay; of lots 1 and 4 shows the effect of different amounts of silage; and lots 2 and 3 shows the effect of entirely replacing the clover hay with silage.

The first noticeable difference in the effect of the rations is shown in the appetites of the cattle for the different feeds. Since this is a very important detail in the effect of rations, the variations in the amount of feed consumed at different stages of the feeding period should be carefully noted.

Table I shows the average amounts of feed consumed daily per steer by thirty-day periods.

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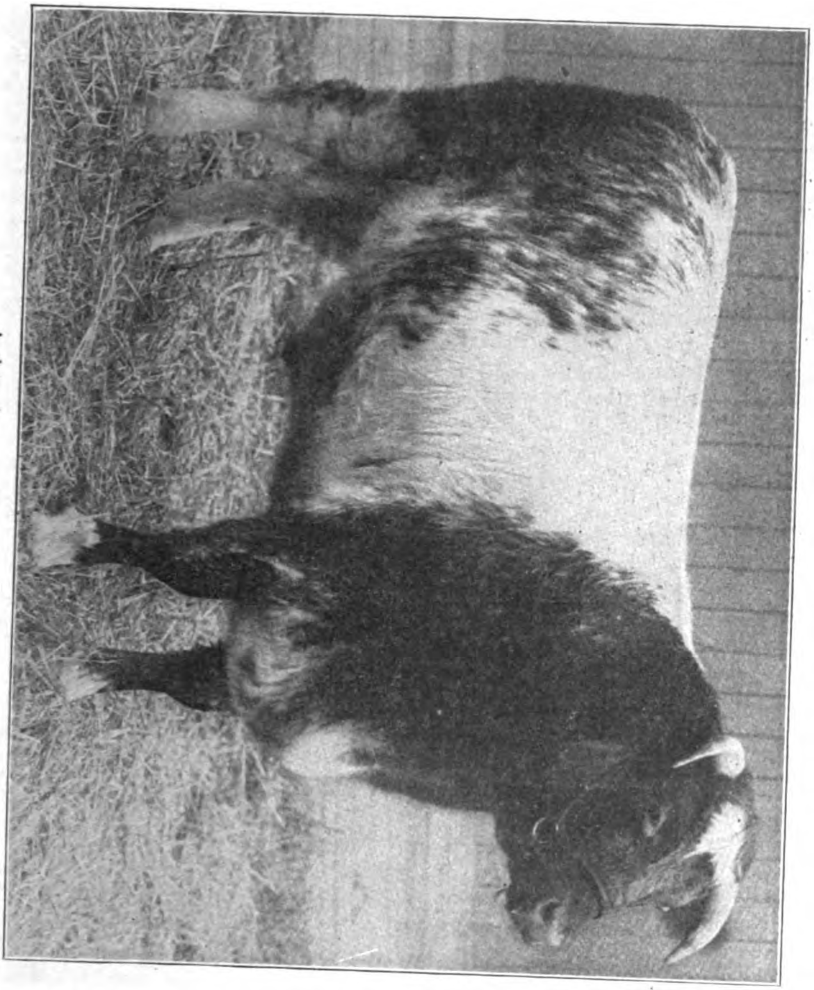

A champion roan Short-horn steer.

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It will be noted that the daily grain consumed during the first two months of the 1909-'10 trial was practically the same in all lots. The grain offered for the first thirty days was the same for all the cattle. The amount fed the first day was six pounds of corn and one-half pound of cottonseed meal per steer. This amount was gradually increased for thirty days, at the end of which time 13 pounds of corn daily per steer and 2.5 pounds of cottonseed meal daily per 1000 pounds live weight were being consumed. An attempt was made in the fourth ten-day period to increase the corn, but it was not successful in any of the lots until near the end of the second thirty-day period, at the end of which time all lots were consuming 14 pounds of shelled corn and a little less than 2.5 pounds of cottonseed meal daily per steer. After the first two months the amounts of grain eaten became variable for the different lots.

In the season of 1910-'11 the cattle were put on full feed in less time than in 1909-'10, and therefore began showing variation in grain consumption more quickly than in the previous year. All lots received six pounds of shelled corn and one-half pound of cottonseed meal daily per steer for four days, when a gradual increase was made in the grain offered, each lot being increased according to appetite until at the end of seventeen days all lots were on full feed. The average amount of grain consumed per steer, when they reached full feed, was 2.8 pounds of cottonseed meal and 18, 18, 14 and 13 pounds of shelled corn daily per steer for lots 1, 2, 3 and 4, respectively. The corn was increased in each lot when the appetites of the steers would justify it, and the cottonseed meal was kept in the proportion of 2.5 pounds per 1000 pounds live weight, the amount being adjusted every ten days when weights of the cattle were taken.

The clover hay in all lots in which it was offered was supplied in such quantities as would be eaten by the cattle before the next time to feed clover. Where silage was fed, the time taken to get the cattle on full feed of this roughage was eighteen days in 1909-'10 and six days in 1910-'11. Twelve pounds of silage per steer was offered at the first feed. The amounts at which the appetites of the steers were satisfied was 17.5 pounds in 1909-'10 and 21 pounds in 1910-'11, lot 1 being fed once and lots 3 and 4 twice daily. Lot 3 in 1910-'11 a few days later was increased to 23 pounds per steer at each feed. This amount, however, was eaten for a comparatively short time.

As is to be expected in fattening cattle, the amount of roughage consumed decreased as the fattening period advanced. This is clearly shown by the figures for 1909-'10, and to some extent in those for 1910-'11. The steers fed in 1910-'11, however, seemed to relish the roughage more than cattle ordinarily do, and consequently continued consuming large amounts of roughage. Better results would probably have followed if less roughage had been consumed during the latter part of the feeding period. In fact, it became necessary to arbitrarily reduce the amount eaten in lot 3 during the last month, in order to insure large enough consumption of grain to return satisfactory gains.

With the above details in mind, the table showing the daily feed consumed presents some interesting figures relating to the appetites of the cattle. Since no attempt was made in 1909-'10 to feed grain to the limit

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of the appetites of the cattle until after the feeding period had been well started, the effect of the various combinations of silage and clover on the grain consumption is best shown by the results of 1910-'11 and the last four months of 1909-'10, when corn was given according to the appetites of the cattle. Considering the matter from this standpoint, it will be noted that the grain consumed depends primarily on the amount of silage eaten. The corn in the silage evidently replaces the shelled corn in the ration in amounts approximating the grain contained in the silage, thereby reducing the amount of grain consumed by cattle on full feed. The cattle on full feed of silage consumed approximately two-thirds as much corn as those receiving only clover hay as roughage. As the fattening period of cattle advances, less roughage and, up to a certain point, more grain is consumed. This point in lot 2 was reached in 1909-'10 at the end of the fourth month and in 1910-'11 at the end of the third month. When silage is being fed, however, the grain consumed does not apparently cease to increase until a very small amount of silage is being consumed. In other words, enough less silage is consumed in the latter end of the feeding period to permit the corn ration being gradually increased, instead of remaining stationary the last month or two as is the case when only dry roughage is fed. The apparent contradiction of these statements in the results of lots 3 and 4 of 1909-'10 is due to some musty and partly rotten corn being fed during the latter part of March and the first part of April that threw the cattle off feed.

Another marked effect of silage in the ration was the reduction in the amount of clover hay eaten. There was, however, no reduction in the quantities of dry matter consumed in the form of roughage. There was approximately the same amount of dry matter in three pounds of silage as in one pound of hay fed these cattle. While there was a very material displacement of hay by silage, depending upon the amount of the latter fed, there was more dry matter consumed where both silage and hay were fed than where either was fed alone.

GAINS. It is a difficult matter to record the efficiency of a ration, because of the varying factors that enter into the problem. The rate of gain is, however, a fairly accurate index of the value of a ration. While the rate of gain is not necessarily an absolute record of the effect of the feeds, it must be relied on more largely than any other one thing to show the difference in rations for fattening purposes. This is especially true, as it is in this case, when the cattle in all lots are of the same age, size, quality and condition at the beginning of the trial. Table II shows the average daily gain and the total gain per steer in each lot.

It will be noted that the rate of gain by monthly periods is quite variable. This is due to conditions other than the rations. The small gains made the second month of 1909-'10 were due to the extremely cold weather during part of the period, when the temperature dropped as low as 17 degrees below zero. Water was very cold all the time, and the silage often froze before the cattle could eat it, thereby causing scouring. Lot 3, receiving corn silage alone as roughage, suffered most severely and lost six pounds per steer during the ten-day period ending January 6, 1910. The extremely small gains for the first month of 1910-'11 were due largely to the conditions of the cattle and the change from pasture to dry

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TABLE II. *Showing average daily gain per steer by months, winter 1909-'10.*

Date of experiment Length of experiment	November 17, 1909—April 26, 1910. (160 days).			
	Lot 1.	Lot 2.	Lot 3.	Lot 4.
RATION.	Shelled corn, cottonseed meal, clover hay (morning), corn silage (evening).	Shelled corn, cottonseed meal, clover hay.	Shelled corn, cottonseed meal, corn silage.	Shelled corn, cottonseed meal, clover hay (morning), corn silage (morning and evening).
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
First month	3.18	2.41	2.36	2.71
Second month	1.81	1.43	1.86	2.60
Third month	3.55	3.23	3.53	3.51
Fourth month	2.05	2.03	2.15	2.21
Fifth month	2.43	1.96	1.60	2.05
Last 10 days	2.17	3.30	2.65	2.75
Total gain per steer	412.70	365.50	372.00	420.50
Average daily gain for entire period	2.58	2.28	2.33	2.63

TABLE II—Concluded. *Showing average daily gain per steer by months, winter 1910-'11.*

Date of experiment Length of experiment	November 18, 1910—April 17, 1911. (150 days.)			
	Lot 1.	Lot 2.	Lot 3.	Lot 4.
RATION.	Shelled corn, cottonseed meal, clover hay (morning), corn silage (evening).	Shelled corn, cottonseed meal, clover hay.	Shelled corn, cottonseed meal, corn silage.	Shelled corn, cottonseed meal, clover hay (morning), corn silage (morning and evening).
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
First month	1.60	①−.04	2.23	1.72
Second month	3.33	3.40	3.42	2.40
Third month	2.65	3.02	2.40	3.62
Fourth month	2.52	2.68	1.38	2.40
Fifth month	2.84	3.11	2.43	1.955
Total gain per steer	388.30	364.90	355.80	362.70
Average daily gain for entire period	2.59	2.43	2.37	2.42

1. — **Denotes a loss.**

lot. The steers were heavy, fleshy feeders and the change from green grass, which was unusually succulent in the fall of 1910, to dry feed was such a radical change that it required a month for some of the lots to get started. The change from grass to silage was not as radical as from grass to clover, and the cattle receiving silage made far more satisfactory gains at first than those receiving clover hay alone as roughage. The superiority of corn silage for the early part of the feeding period, when cattle are taken from grass, is shown by the first two months' gains of each of the two years' trials reported.

The gains for the entire period are more reliable, because they cover a greater length of time and are also based on the average of three days' weights at the beginning and end of the experiment. These gains show that the addition of a limited amount of silage (lot 1) to a ration of corn, cottonseed meal and clover hay (lot 2) increased the gain in 1909-'10 from 2.28 to 2.58 pounds daily per steer, and in 1910-'11 from 2.43 to 2.59 pounds, or an average for the two years of 0.23 pound daily per steer. The effect of adding corn silage to the limit of the appetites of the cattle (lot 4) was to make a more rapid gain in 1909-'10 than where only a limited quantity of silage was fed, and in 1910-'11 to give the same gain as when no silage was fed. The gains of 1910-'11 are somewhat misleading, due to the fact that a steer in lot 4 was troubled with bloat and made only 70 pounds gain before being removed from the lot at the end of 100 days.* Based on the records of the nine thrifty steers, the gains of lot 4 would have been 2.57 pounds daily per steer. This is practically the same gain made by lot 1, which shows that the full amount of silage gave as rapid gains as a limited feed and that both rations containing silage produced on an average more than a quarter of a pound faster gains than when no silage was fed.

TABLE III. *Showing average amount of feed consumed per pound gain and cost per 100 pounds gain, with feeds at varying prices.*

RATION.	Lot 1.	Lot 2.	Lot 3.	Lot 4.
	Shelled corn, cottonseed meal, clover hay (morning), corn silage (evening).	Shelled corn, cottonseed meal, clover hay.	Shelled corn, Cottonseed meal, corn silage.	Shelled corn, cottonseed meal, clover hay (morning), corn silage (morning and even'g)
Feed per pound gain:	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*
1909-'10:				
Shelled corn	5.94	6.91	5.86	5.50
Cottonseed meal	1.02	1.10	1.05	.98
Clover hay	2.97	5.15	....	1.69
Corn silage	5.40	....	11.90	10.56
1910-'11:				
Shelled corn	7.05	8.39	6.19	5.95
Cottonseed meal	1.18	1.22	1.28	1.24
Clover hay	2.25	4.53	...	1.86
Corn silage	8.02	....	16.09	12.82
Cost per cwt. gain:				
Actual cost: ①				
1909-'10	$9 76	$10 98	$9 42	$9 56
1910-'11	8 82	9 71	8 49	8 71
Corn at 50 cts. per bu.: ②				
1909-'10	9 25	10 40	8 89	9 07
1910-'11	10 59	11 58	10 27	10 35
Average	9 90	10 99	9 56	9 66
Corn at 40 cts. per bu.: ③				
1909-'10	8 06	9 16	7 54	7 83
1910-'11	9 13	10 08	8 76	8 96
Average	8 58	9 62	8 14	8 35

1. These figures are based on the following prices:
1909-'10: Shelled corn, first month, 49.9 cents; second month, 55.7 cents; third month 56.7 cents; fourth month, 58.7 cents; fifth month, 51.9 cents; last 10 days, 50.2 cents; cottonseed meal, $38 per ton; clover hay, $10 per ton; corn silage, $3.50 per ton.
1910-'11: Shelled corn, first month, 36.1 cents; second month, 37 cents; third month, 37.8 cents; fourth month, 36.9 cents; fifth month, 39.8 cents per bushel; cottonseed meal, $30 per ton; clover hay, $10 per ton; corn silage, $3 per ton.
2. Clover hay, $10 per ton; cottonseed meal, $30 per ton; corn silage, $3.50 per ton.
3. Clover hay, $10 per ton; cottonseed meal, $30 per ton; corn silage, $3 per ton.

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* All records in this bulletin involving lot IV, 1910-'11, are based on figures for 10 steers for 100 days and on figures for 9 steers for 50 days. One-ninth has been added to the figures obtained during the last 50 days in order to raise the totals to a basis of 10 steers for 150 days.

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The effect of using corn silage as the exclusive roughage was to very slightly increase the rate of gain in 1909-'10 over the clover-hay lot and to cause a corresponding decrease in 1910-'11. The average of the two years is almost identical for the rate of gain between the two lots, and a little more than a quarter of a pound less than when both silage and hay were fed.

COST OF GAINS. The cost of gains depends so largely on the price of feeds that any thorough discussion of the subject must necessarily be based on different prices of feeds.

Table III shows the average amounts of feed consumed per pound of gain and the cost per 100 pounds gain with feed at different prices.

It will be observed that the feed required to make a pound of gain was much greater in 1910-'11 than in 1909-'10. This is due to the fact that the cattle were both older and fleshier in 1910-'11, at the time they were placed on feed, than were the cattle fed the previous year. Since both age* and higher condition on cattle increase the cost of gains, it was to be expected that the expense of making gain would be higher with the heavier cattle. Also, the winter of 1910-'11 was so warm, and there were so many damp, disagreeable days, that the cattle did not gain as well as they normally should.

Table III brings out in a most striking manner the principal and most characteristic advantage of corn silage over dry roughage as a feed for fattening cattle. The least reduction in cost per 100 pounds gain due to silage was 89 cents, and in one case it amounted to $1.56. The grain required to make a pound of gain was least in lot 4 of both years, with lot 3 a close second. Lot 2 required a much larger amount of grain than any other lot. The roughage required to make a pound of gain was practically in reverse order to the grain required for the same purpose. The cost of the clover hay and the extra amount of grain required for the gains made was such that the cost per 100 pounds gain was greatest where the largest amount of dry roughage was eaten, and decreased quite consistently as the clover hay was replaced by corn silage. Lot 3, where only corn silage was fed for roughage, made the cheapest gain each year. It will be seen than lot 4, where a full feed of silage was fed in connection with clover hay, gave almost as cheap gains as lot 3, and that lot 1, where only half feed of silage was given, effected a saving of $1.22 and 89 cents per 100 pounds gain over lot 2 in 1909-'10 and 1910-'11, respectively.

The most reliable basis of comparison of costs is when feed is valued at a fixed price for both years. Table III contains figures on the cost of gain when both years' trials are reckoned on stationary prices for feed. It will be noted that in every case the highest cost of gain is in lot 2, where no silage was fed, the average being $10.99 per 100 pounds gain with corn at 50 cents per bushel, and $9.62 with corn at 40 cents per bushel. With corn valued at 50 cents per bushel the cost of making gains was reduced by the addition of corn silage once daily (lot 1), $1.09 per 100 pounds; and with corn at 40 cents per bushel, $1.04 per 100 pounds. By the addition of corn silage twice daily (lot 4) there was a further reduction in cost enough to make it $1.33 and $1.27 less per 100 pounds

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* Purdue experiment station bulletins Nos. 129, 136, 146.

than the clover-hay-fed lot, according to whether corn is 50 cents or 40 cents per bushel, respectively. When the process of substituting corn silage for clover hay was carried still further, and no hay whatever fed (lot 3), the cost of making gains was further reduced, the total reduction being $1.43 and $1.48 per 100 pounds gain as corn was 50 cents or 40 cents per bushel, respectively. The fact should not be lost sight of, however, that both corn and corn silage are lacking in protein, and that some nitrogenous concentrate must be fed in connection with them in order to reduce the cost of making gains.

Finish. The finish on the cattle is really the deciding factor in any ration. A few cents advance or decline in the selling price of fat cattle may very easily overcome a great difference in the cost of gains, because the gains are not a large per cent of the total weight of the cattle if mature steers are used for feeding. Neither is the total gain an absolute index of the selling price of the cattle, for it has often been observed that the same number of pounds gain made from different rations may result in a great difference in the finish of the cattle. For this reason the finish secured on the cattle is of great importance in determining the value of a ration.

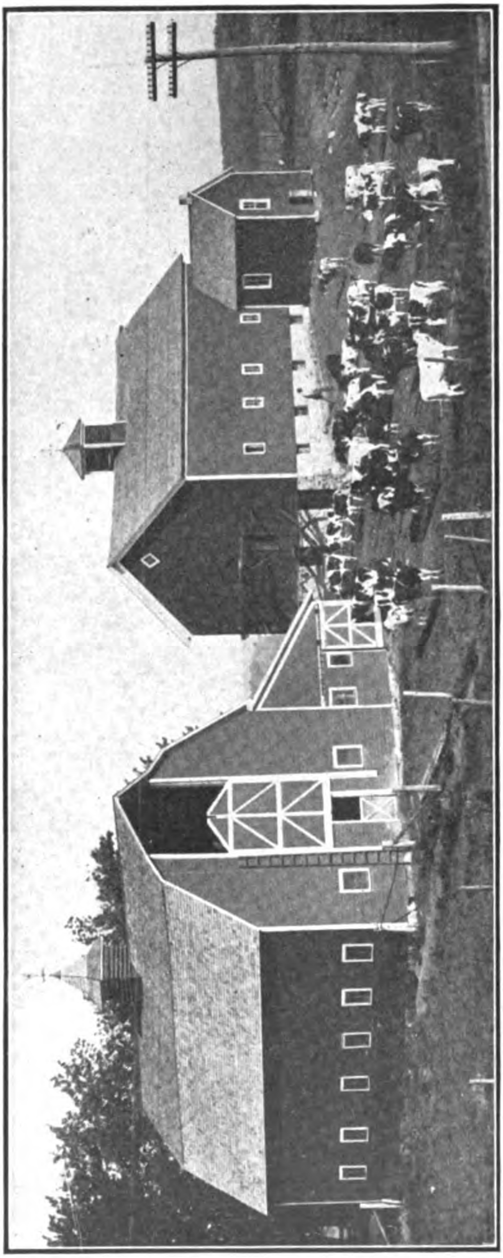
The effect of the different rations upon the finish of cattle is shown by table IV, which gives the selling values of the cattle in the feed lots at the end of the feeding period and after a short feeding period.

TABLE IV. *Showing selling value of cattle at end of feeding trial and at an earlier period in the experiment.*

	Lot 1.	Lot 2.	Lot 3.	Lot 4.
RATION.	Shelled corn, cottonseed meal, clover hay (morning), corn silage (evening).	Shelled corn, cottonseed meal, clover hay.	Shelled corn, cottonseed meal, corn silage.	Shelled corn, cottonseed meal, clover hay (morning), corn silage (morning and even'g).
Selling value in lot at end of trial:				
1909-'10	$7 25	$7 30	$7 20	$7 60
1910-'11	5 95	5 85	5 75	5 85
Selling value after short feed:				
1909-'10 (40 days before end of trial)	7 45	7 20	7 25	7 60
1910-'11 (60 days before end of trial)	5 70	5 50	5 60	5 70
Excess in selling value over clover-hay lot at end of experiment:				
1909-'10	— 05	....	— 10	30
1910-'11	10	....	— 10	00
Excess in selling value over clover-hay lot after short feed:				
1909-'10	25	....	05	40
1910-'11	20	....	10	20

The figures are of service only in showing the relative finish on the cattle. Because of variations in the market and in the demand for cattle of different finish, any valuations should be considered only as approximating differences in the finish of cattle.

Taking the ration of lot 2, receiving only clover hay for roughage, as a standard, it will be noted that in 1909-'10 the addition of corn silage once daily failed to finish the cattle as well by 5 cents per hundred as



Some good farm and dairy barns.

where only clover hay was used. This condition is reversed in 1910-'11, when the addition of the silage increased the selling price 10 cents per hundred. These valuations, however, are so nearly the same that the two rations must be considered practically equal as regards the finish made on the cattle. By the addition of a large amount of silage (lot 4) the results of 1909-'10 show an excess in selling price due to better finish of 30 cents per hundred, while in 1910-'11 the finish secured was the same as in lot 2. By substituting corn silage for clover hay there was a marked change in the finish of the steers, the cattle being valued in both cases 10 cents per hundred below those receiving clover hay.

These figures are based upon the finish after a long feeding period, and do not indicate the effect of the rations at different periods of the fattening process. Observations of the cattle readily showed that the addition of corn silage to the ration had a very much more marked effect during the early part of the fattening process, and that after the cattle became more than half fat those on dry roughage made comparatively rapid progress in finish. This is shown by the valuations of the cattle 40 and 60 days, respectively, before the close of the experiments. The extremely high valuation of the cattle after a short feed in 1909-'10 was due to a very much stronger market at that time than when the experiment closed. Since this high valuation is due entirely to market fluctuations it should not be considered as showing lack of improvement in the finish of the cattle during the last 40 days' feeding. It will be noted that the addition of a limited amount of corn silage to a ration of corn, cottonseed meal and clover hay showed, after a short feed, 25 and 20 cents per hundred increase in the selling value of the cattle in 1909-'10 and 1910-'11, respectively; that the addition of a large amount of silage showed 40 and 20 cents per hundred increase; and that the substitution of silage for hay showed 5 and 10 cents increase in selling price over clover hay alone as roughage. Much greater improvement in the finish of cattle was shown during the early part of the feeding period in the silage-fed lots. More rapid improvement in finish, however, was made during the latter part of the feeding period by the cattle receiving clover hay only as roughage. Observations of trials with corn silage through a series of years at this station point to the fact that it is often necessary, where silage is of superior quality and exceptionally palatable, to limit the amounts of this roughage fed to fattening cattle during the latter part of the feeding period in order to induce the consumption of large enough quantities of grain to insure satisfactory results.

SUMMARY. The only satisfactory method of judging the economy of rations is to consider together all the controlling factors entering into the feeding operation. No single factor is a true measure of the economy of a ration. The great number of factors involved in cattle feeding makes it impossible, in a limited space, to clearly discuss them in their numerous and complex combinations. Therefore, the discussion of the trials as a complete transaction is presented, with such variable factors as weight and cost of cattle, cost of gains, selling price of cattle, and profit or loss per steer as they occurred during the trials.

Table V shows a complete summary of the results.

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TABLE V. *Summary of Part I—1909-'10.*

Date of experiment Length o experiment	November 17, 1909—April 26, 1910. (160 days.)			
	Lot 1.	Lot 2.	Lot 3.	Lot 4.
RATION.	Shelled corn, cottonseed meal, clover hay (morning), corn silage (evening).	Shelled corn, cottonseed meal, clover hay.	Shelled corn, cottonseed meal, corn silage.	Shelled corn, cottonseed meal, clover hay (morning), corn silage (morning and evening).
Initial value per cwt	$4 65	$4 65	$4 65	$4 65
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
Average initial weight	900.00	889.50	897.50	892.50
Average final weight	1,312 70	1,255.00	1,269.50	1,313.00
Total gain per steer	412.70	365.50	372.00	420.50
Average daily gain per steer	2.58	2.28	2.33	2.63
Total feed consumed:				
Shelled corn	24,520.00	25,250.00	21,795.00	23,110.00
Cottonseed meal	4,171.50	4,028.50	3,898.50	4,134.50
Clover hay	12,264.00	18,837.00		7,086.00
Corn silage	22,280.00		44,276.00	44,418.00
Average daily feed per steer:				
Shelled corn	15.33	15 78	13.62	14.44
Cottonseed meal	2.61	2.52	2.44	2.58
Clover hay	7.67	11.77		4.43
Corn silage	13.93		27.67	27.76
Feed consumed per pound gain:				
Shelled corn	5.94	6.91	5.86	5.50
Cottonseed meal	1.02	1.10	1.05	.98
Clover hay	2.97	5.15		1.69
Corn silage	5.40		11.90	10.56
Cost of gain per cwt	$9 76	$10 98	$9 42	$9 56
Necessary selling price	6 26	6 49	6 05	6 22
Selling value of cattle in feed lots, without shrinkage	7 25	7 30	7 20	7 60
Profit per steer (without pork)	13 02	10 12	14 64	18 09
Pork produced per lot	② 900 lbs.	② 723 lbs.	② 620 lbs.	③ 1,405 lbs.
Profit per steer (including pork) ①	$21 04	$16 54	$20 14	$28 21

1. Pork valued at nine cents per pound, 1909-'10.
2. 90 pounds of corn fed to hogs.
3. 2665 pounds of corn fed to hogs.

In the above summary the prices of feeds are as follows for 1909-'10: Clover hay, $10 per ton; cottonseed meal, $33 per ton; corn silage, $3.50 per ton; shelled corn, first month, 49.9 cents; second month, 55.7 cents; third month, 56.7 cents; fourth month, 53.7 cents; fifth month, 51.9 cents; last 10 days, 50.2 cents per bushel. 1910-'11: Shelled corn, first month, 36.1 cents; second month, 37 cents; third month, 37.8 cents; fourth month, 36.9 cents; and fifth month, 39.3 cents per bushel; cottonseed meal, $30 per ton; clover hay, $10 per ton; corn silage, $3 per ton. No account is included of the straw used as bedding nor of labor of feeding; neither is there any account of the manure produced. The prices of feeds used are what they were worth in Lafayette during the progress of the experiment. The pork produced from the droppings is considered a by-product of the cattle-feeding operations, and must be added to the receipts from the cattle. In 1909-'10 the number of hogs in each lot varied somewhat according to the condition of the lots. However, there were

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TABLE V—Concluded. *Summary of Part I—1910-'11.*

Date of experiment Length of experiment	November 18, 1910 – April 17, 1911. (150 days.)			
	Lot 1.	Lot 2.	Lot 3.	Lot 4.
RATION.	Shelled corn, cottonseed meal, clover hay (morning), corn silage (evening).	Shelled corn, cottonseed meal, clover hay.	Shelled corn, cottonseed meal, corn silage.	Shelled corn, cottonseed meal, clover hay (morning), corn silage (morning and evening).
Initial value per cwt	$5 00	$5 00	$5 00	$5 00
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
Average initial weight	1,122	1,121.3	1,121	1,116.9
Average final weight	1,510.3	1,486.2	1,476.8	1,479.6
Total gain per steer	388.3	364.9	355.8	362.7
Average daily gain per steer	2.59	2.43	2.37	2.42
Total feed consumed:				
Shelled corn	27,393	30,610	22,027	21,568
Cottonseed meal	4,565	4.439.5	4,563.5	4.505
Clover hay	8,748	16,515	....	6,753
Corn silage	31,160	....	57,255	46,493
Average daily feed per steer:				
Shelled corn	18.26	20.41	14.68	14.38
Cottonseed meal	3.04	2.96	3.04	3.00
Clover hay	5.83	11.01	....	4.50
Corn silage	20.77	....	38.17	31.00
Feed consumed per pound gain:				
Shelled corn	7.05	8.39	6.19	5.95
Cottonseed meal	1.18	1.22	1.28	1.24
Clover hay	2.25	4.53	....	1.86
Corn silage	8.02	....	16.09	12.82
Cost of gain per cwt	$8 82	$9 71	$8 49	$8 71
Necessary selling price	5 98	6 16	5 84	5 91
Selling value of cattle in feed lots, without shrinkage	5 95	5 85	5 75	5 85
Profit per steer (without pork)	(Loss) 50	(Loss) 4 57	(Loss) 1 34	(Loss) 86
Pork produced per lot	810 lbs.	1,005 lbs.	790 lbs.	650 lbs.
Profit per steer (including pork)①	$4 36	$1 46	$3 40	$3 04

1. **Pork valued at six cents per pound, 1910-'11.**

usually five hogs in each of the first three lots and ten hogs in lot 4, the latter being fed shelled corn in addition to the droppings, while those in lots 1, 2 and 3 were fed nothing extra after the first ten days. For this reason the "profit, including pork," in lot 4 is not entirely comparable with the same item in the other lots, where no additional grain was fed after the first ten days. In 1910-'11 there were eight hogs per lot, and they received no grain after being placed in the feed lots. Pork produced in 1909-'10 is valued at nine cents per pound, and that produced in 1910-'11 at six cents per pound. The grain fed the hogs in 1909-'10 is valued at 53 cents per bushel, and its value is deducted from the value of the pork actually produced before the pork produced from the droppings is accredited to the receipts from the cattle.

The unusually large returns of 1909-'10 and the extremely small profits of 1910-'11 are due to the condition of the market at the end of the two trials. The spring of 1910 saw an abnormally high market for all classes of meat animals, while, considering the high price of feeding cattle in the fall of 1910, the spring of 1911 witnessed a very dull and unsatisfactory market. Considering the trial as a whole, the ration of

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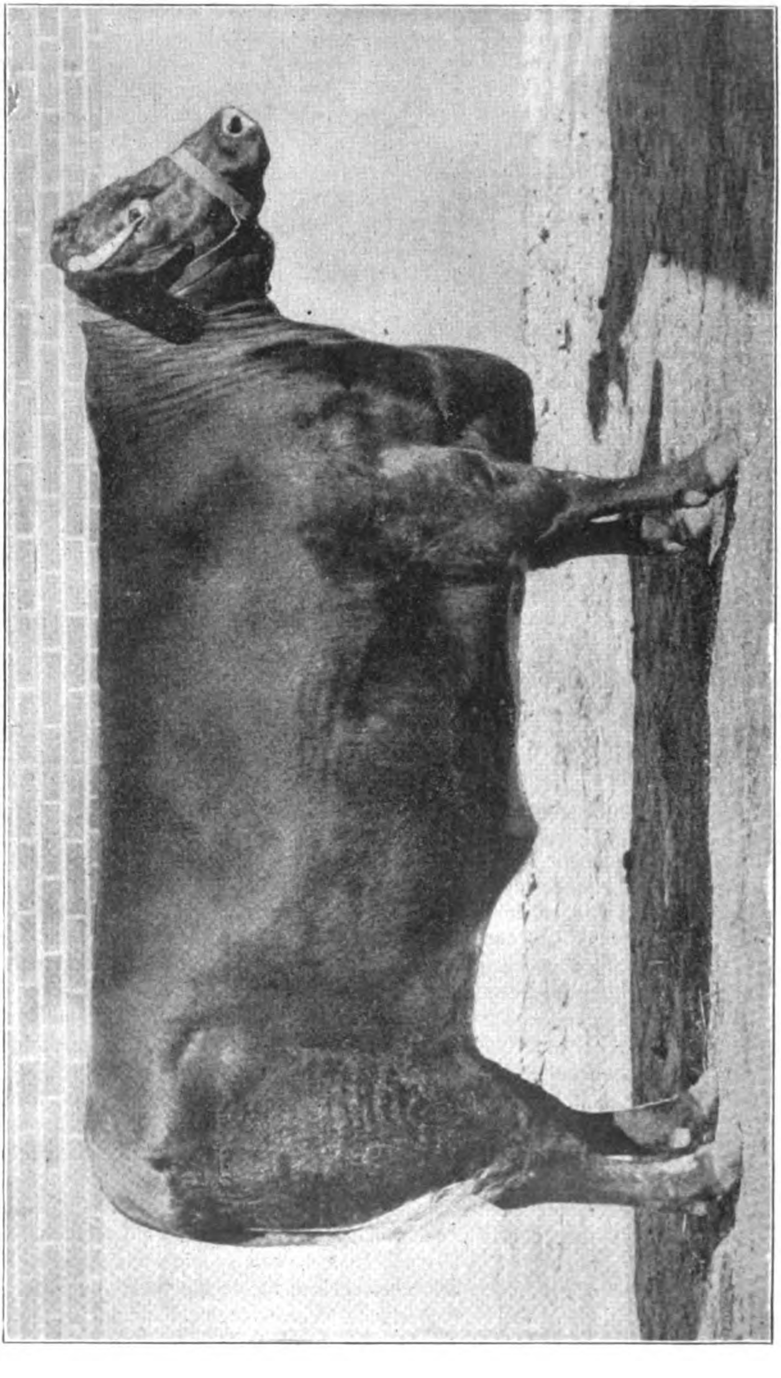

A champion red Short-horn steer.

shelled corn, cottonseed meal and clover hay proved to be the least profitable of the four. This was not due to small gains or a lack of finish on the cattle, but to the greater cost of gains. With the initial weight of 889.5 pounds in 1909-'10 and 1121.3 pounds in 1910-'11, at a cost in the feed lots of $4.65 and $5 per cwt., respectively, the necessary margin to come out even on the cattle was $1.84 per cwt. in the former case and $1.16 per cwt. in the latter. The selling price was such that a profit without pork of $10.12 per steer in 1909-'10 and a loss of $4.57 per steer in 1910-'11 was returned in lot 2, receiving the clover hay only as roughage.

By the addition of a limited amount of corn silage to the ration, as has been noted, the rate of gain was increased and the cost of gain decreased to such an extent that the cattle could have sold for 23 cents per cwt. less in 1909-'10 and 18 cents per cwt. less in 1910-'11 than lot 2 and still make the same returns to the feeder. The cattle sold practically the same. Lot 1 returned a profit of $2.90 per steer more the first year, and a smaller loss by $4.07 per steer the second year than lot 2, receiving no silage. When the pork produced from the droppings is considered, there was a profit of $21.04 and $16.54 per steer for lots 1 and 2, respectively, of 1909-'10, and a profit of $4.36 and $1.46 per steer for the same lots of 1910-'11. The effect of adding a limited amount of corn silage to a ration of corn, cottonseed meal and clover was to decrease the cost of gains very materially without greatly affecting the other factors in the feeding operation, thereby returning an appreciably larger profit per steer.

The comparative economy of feeding, in connection with clover hay, corn silage in unlimited quantities instead of once daily is shown by comparing lots 4 and 1. As has been pointed out on a previous page, the rate of gain is approximately the same. The cost of gain is slightly less when a full feed of silage is given. The necessary margin required to come out even on the cattle was four cents in 1909-'10 and seven cents in 1910-'11 more per cwt. for the half than for the full feed of silage. The selling value of the cattle was 35 cents per cwt. higher in 1909-'10 and 10 cents per cwt. lower in 1910-'11 for the full-fed silage lot than for the half-fed silage lot, thereby giving a return, not including pork, of $5.07 more profit per steer in 1909-'10 and 36 cents more loss per steer in 1910-'11. The pork produced from the droppings in 1909-'10 was much greater for the full-fed silage lot, while in 1910-'11 the result was reversed. An excess of hogs that received corn in addition to the droppings was in this lot in the former year, while the same number of hogs were in both lots the latter year. It must be borne in mind, however, in connection with the effect of the amount of silage to use in a ration, that after the cattle are half fat the amount of silage must be decreased in order to secure satisfactory results.

The effect of entirely replacing clover hay with corn silage for roughage was to reduce the rate of gain somewhat from that made when both clover hay and corn silage were fed to about the same gain as was made when clover hay was the only roughage. The cost of gain, which was greatly reduced by substituting silage for clover hay, was least in lot 3 of any of the lots fed in the two trials. The necessary margin was 17

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cents and 7 cents per cwt. for 1909-'10 and 1910-'11, respectively, less than lot 4, receiving a full feed of silage and clover, which required the next smallest margin to make the cattle pay for the original cost and the feed. The cattle, however, did not acquire as good finish as when clover hay was contained in the ration, so that the profit per steer was not greatly different for the two years from that returned by the rations containing both silage and clover hay.

The four rations indicate very strongly that the more nearly the clover hay is replaced by corn silage the greater is the reduction in the cost of making gains, but that for the latter half of the fattening period the roughage must be limited to such amounts that enough grain will be eaten to return satisfactory gains. Otherwise there will be a lack of finish on the cattle that will partially or entirely overcome the advantage derived from the more economical gains.

PART II. INFLUENCE OF DIFFERENT PROPORTIONS OF COTTONSEED MEAL IN RATIONS FOR FATTENING STEERS.

The availability of corn and its cheapness compared with other concentrates will make it the mainstay of the corn-belt cattle feeder as long as present economic conditions exist. It is well known, however, that corn does not contain sufficient protein to make a well-balanced ration, and it has been thoroughly demonstrated that the judicious use of leguminous roughages and high-protein concentrates as supplements to corn increases the rate of gain and may decrease the cost of gain.* There are little or no available data, however, from which the practical cattle feeder can determine the amount of these high-protein concentrates required to produce the most economical results. This experiment station began investigations during the winter of 1909-'10, which were planned as a step toward the solution of this question. The scope of the experiment was limited to the use of two different proportions of one kind of nitrogenous concentrate (cottonseed meal) in two different rations. Part II of this bulletin is submitted as a report of the present progress of this investigation.

The cattle used in the test were two- and three-year-olds.

In each of two years' trials four lots of ten steers each were fed the following rations:

Lot 1. Shelled corn, cottonseed meal 2.5 pounds per 1000 pounds live weight daily, clover hay (morning), corn silage (evening).

Lot 2. Shelled corn, cottonseed meal 2.5 pounds per 1000 pounds live weight daily, clover hay.

Lot 5. Shelled corn, cottonseed meal 1.25 pounds per 1000 pounds live weight daily, clover hay (morning), corn silage (evening).

Lot 6. Shelled corn, cottonseed meal 1.25 pounds per 1000 pounds live weight daily, clover hay (morning), corn silage (evening).

The only difference between the rations of lots 1 and 5, and between those of lots 2 and 6 is in the amount of cottonseed meal fed. A comparison of lots 1 and 5 shows the relative value of adding 2.5 and 1.25 pounds respectively of cottonseed meal daily per 1000 pounds live weight to a ration of shelled corn, clover hay, and corn silage. A similar com-

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* Bulletins Nos. 115, 129, and 136.

parison is shown in lots 2 and 6, except that the basal ration consists of shelled corn and clover hay without corn silage. The proportion of cottonseed meal to the live weights of the cattle was adjusted every ten days according to the weights of the cattle.

1.—Influence of Different Proportions of Cottonseed Meal in a Ration of Shelled Corn, Clover Hay, and Corn Silage.

Since the first effect of a ration is usually shown in the appetites of the cattle, the average amount of the feed consumed daily per steer by thirty-day periods is presented in table VI.

TABLE VI. *Showing average amount of feed consumed daily per head by fattening steers, winters 1909-'10 and 1910-'11.*

Date of experiment Length of experiment	Nov. 17, 1909—Apr. 26, 1910. (160 days.)		Nov. 18, 1910—Apr. 17, 1911. (150 days.)	
	Lot 1.	Lot 5.	Lot 1.	Lot 5.
RATION.	Shelled corn, cottonseed meal, clover hay (morning), corn silage (evening).	Shelled corn, cottonseed meal, clover hay, (morning), corn silage (evening).	Shelled corn, cottonseed meal, clover hay (morning), corn sila e (evening).	Shelled corn, cottonseed meal, clo er hay (morning), corn silage (evening).
Cottonseed meal daily per 1000 lbs. live weight	2.5 lbs.	1.25 lbs.	2.5 lbs.	1.25 lbs
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
First month:				
Shelled corn	10.60	10.60	13.13	13.35
Cottonseed meal	1.79	.89	1.86	.96
Clover hay	9.20	9.03	9.17	8.85
Corn silage	15.48	15.48	20.53	20.80
Second month:				
Shelled corn	13.48	13.48	18.05	18.57
Cottonseed meal	2.47	1.20	2.97	1.48
Clover hay	8.13	7.63	4.99	5.00
Corn silage	16.08	16.08	21.00	18.50
Third month:				
Shelled corn	14.95	14.95	19.25	20 00
Cottonseed meal	2.68	1.27	3 27	1.62
Clover hay	8.00	8.00	5.00	5.00
Corn silage	15.00	15.00	21.00	19.00
Fourth month:				
Shelled corn	17.53	17.50	20.00	20.00
Cottonseed meal	2.97	1.50	3.43	1.68
Clover hay	7.29	6.76	5.00	5.00
Corn silage	14.17	14.15	21.00	19.00
Fifth month:				
Shelled corn	18.98	19.22	20.88	20.92
Cottonseed meal	3.00	1.50	3.68	1 78
Clover hay	6.31	5.80	5.00	4.83
Corn silage	10.87	10.87	20.33	19.00
Last 10 days:				
Shelled corn	18.55	18.85		
Cottonseed meal	3.00	1.50		
Clover hay	5.85	5.74		
Corn silage	8.00	8.00		
Average of entire period:				
Shelled corn	15.33	15.38	18.26	18.57
Cottonseed meal	2.61	1.29	3.04	1.505
Clover hay	7.67	7.34	5.83	5.64
Corn silage	13.93	13.92	20.77	19.26

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Short-horn bull Tongswood Bamton. Owned in England.

In 1909-'10 both lots were started on six pounds of shelled corn daily per head. Lot 1 received one-half pound and lot 5 one-fourth pound of cottonseed meal daily per steer. This was gradually increased until at the end of 30 days both lots were receiving 13 pounds of shelled corn and 2.4 pounds and 1.2 pounds of cottonseed meal daily per steer. Both lots were started on 12 pounds of corn silage and 10 pounds of clover hay daily per steer. The clover hay consumed decreased as the amount of other feed was increased, until at the end of 17 days the cattle were consuming only nine pounds daily per head. The amount of silage fed was gradually increased until about the middle of the second 10-day period, when each lot was receiving 17.5 pounds of silage daily per steer. From this time the consumption of roughage decreased as the concentrates eaten increased. It was the intention to keep the amounts of silage consumed by the two lots as nearly equal as possible.

In 1910-'11 the lots were started as they had been the previous year, except that a more rapid increase was made in getting the cattle on full feed. On the eighth day, when both lots were receiving 9 pounds of corn, 12 pounds clover hay and 21 pounds of silage, and 1.10 pounds and .65 pound of cottonseed meal respectively, the appetites of the steers in lot 5 seemed to be sharper than of those in lot 1, and 0.5 pound additional corn per steer was fed. From this until the end of the first 90 days lot 5 ate 0.5 pound more daily per steer than the steers in lot 1. At the end of 30 days, however, there was a decrease in the amount of silage consumed by the cattle in lot 5, and thenceforward they refused to eat as much by about 2 pounds per steer as did those in lot 1. In fact, lot 5 throughout the trial relished the grain more than the silage and seldom ate the silage until the grain was cleaned up; while lot 1 relished the silage to such an extent that in case the corn was not cleaned up when the silage was offered the former was not eaten until the latter was all consumed. Even after the steers in lot 1 were very fat, the amount of silage consumed was not decreased until the second 10-day period of the fifth month. It would have been possible at any time to have reduced the amount of silage eaten in lot 5 by increasing the grain, but not so in lot 1, because the silage would have been eaten before the grain was cleaned up.

In 1909-'10 there was a marked uniformity of appetite. The consumption of both corn and roughage was practically the same in both lots, the only difference being in the amount of cottonseed meal offered. In 1910-'11, however, there was a difference in the relish for corn and for corn silage between the two lots. Lot 1, receiving 2.5 pounds of cottonseed meal per 1000 pounds live weight, relished the silage more than lot 5, receiving only half as much cottonseed meal, but the latter relished corn more than the former.

GAINS. Table VII shows the average daily and total gain per steer by months.

As explained in Part I of this bulletin, the low gain the second month of 1909-'10 was due to extremely cold weather during that period. The low gain for the first month of 1910-'11 was due to the condition of the cattle and the change from pasture to dry lot.

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TABLE VII. *Showing average daily gain per steer by months during winters 1909-'10 and 1910-'11.*

Date of experiment. Length of experiment.	Nov. 17, 1909—Apr. 26, 1910. (160 days).		Nov. 18, 1910—Apr. 17, 1911. (150 days).	
	Lot 1.	Lot 5.	Lot 1.	Lot 5.
RATION.	Shelled corn, cottonseed meal, clover hay (morning), corn silage (evening).	Shelled corn, cottonseed meal, clover hay (morning), corn silage (evening).	Shelled corn, cottonseed meal, clover hay (morning), corn silage (evening).	Shelled corn, cottonseed meal, clover hay (morning), corn silage (evening).
Cottonseed meal daily per 1,000 lbs. weight	2.5 lbs.	1.25 lbs.	2.5 lbs.	1.25 lbs.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
First month	3.18	2.35	1.60	1.61
Second month	1.81	1.68	3.38	2.80
Third month	3.55	2.98	2.65	2.38
Fourth month	2.05	1.68	2.52	2.33
Fifth month	2.43	2.78	2.84	2.57
Last 10 days	2.17	2.50		
Total gain per steer	412.70	368.00	388.30	350.70
Average daily gain for entire period	2.58	2.30	2.59	2.34

It will be noted that the rate of gain was very materially increased by using 2.5 pounds instead of 1.25 pounds of cottonseed meal daily per 1000 pounds live weight. The use of the larger amount of nitrogenous concentrate effected an increase in daily gain in 1909-'10 of 0.28 pound and in 1910-'11 of 0.25 pound daily per steer. The effect of the heavier amount of cottonseed meal is more apparent when silage is fed than otherwise, because both corn and silage have an excess of carbohydrates and require more nitrogenous feed to balance the ration than if a leguminous hay were used for roughage.

COST OF GAINS. Table VIII shows the amount of feed consumed per pound gain and the cost per 100 pounds gain with corn at different prices.

It will be noted that, with the exception of the cottonseed meal, less feed was required to make a pound of gain when 2.5 pounds of the meal per 1000 pounds live weight were used. When corn is valued at 40 cents per bushel the average of the two years shows that the cost per hundred pounds gain is equal for the two rations, and that with corn above 40 cents the cost is in favor of the larger amount of cottonseed meal, while if corn is below 40 cents the cost is in favor of the smaller amount of cottonseed meal. The higher the price of corn above 40 cents per bushel the greater was the difference in the cost of gains in favor of lot 1; the lower the price of corn below 40 cents per bushel the greater the difference in cost in favor of lot 5.

FINISH. The effect of different proportions of cottonseed meal in a ration on the finish secured on the cattle is shown in table IX, which gives the selling value of the cattle.

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TABLE VIII. *Showing average amount of feed consumed per pound gain, and cost per 100 pounds gain with feeds at varying prices.*

Date of experiment Length of experiment	Nov. 17, 1909—Apr. 26, 1910. (160 days.)		Nov. 18, 1910—Apr. 17, 1911. (150 days.)		Average of two trials.	
	Lot 1.	Lot 5.	Lot 1.	Lot 5.	Lot 1.	Lot 5.
RATION.	Shelled corn, cottonseed meal, clover hay (morning), corn silage (evening).	Shelled corn, cottonseed meal, clover hay (morning), corn silage (evening).	Shelled corn, cottonseed meal, clover hay (morning), corn silage (evening).	Shelled corn, cottonseed meal, clover hay (morning), corn silage (evening).		
Cottonseed meal daily per 1000 pounds, live weight	2.5 lbs.	1.25 lbs.	2.5 lbs.	1.25 lbs.	2.5 lbs.	1.25 lbs.
Feed per pound gain:	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*
Shelled corn	5.94	6.69	7.05	7.94	6 48	7.30
Cottonseed meal	1.02	0.56	1.18	0.64	1.09	0.60
Clover hay	2.97	3.19	2.25	2.41	2.62	2.81
Corn silage	5.40	6.05	8.02	8.24	6.67	7.12
Cost per cwt. gain:						
Actual cost ①	$9 76	$9 95	$8 82	$8 73		
Corn at 50 cents per bushel ②	9 25	9 47	10 59	10 70	$9 90	$10 07
Corn at 40 cents per bushel ③	8 06	8 12	9 13	9 08	8 58	8 59

1. These figures are based on the following prices:

1909-'10: Shelled corn, first month, 49.9 cents; second month, 55.7 cents; third month, 56.7 cents; fourth month, 53.7 cents; fifth month, 51.9 cents; last 10 days, 50.2 cents per bushel; cottonseed meal, $33 per ton; clover hay, $10 per ton; corn silage, $3.50 per ton.

1910-'11: Shelled corn, first month, 36.1 cents; second month, 37 cents; third month, 37.8 cents; fourth month, 36.9 cents; fifth month, 39.3 cents per bushel; cottonseed meal, $30 per ton; clover hay, $10 per ton; corn silage, $3 per ton.

2. Clover hay, $10 per ton; cottonseed meal, $30 per ton; corn silage, $3.50 per ton.

3. Clover hay, $10 per ton; cottonseed meal, $30 per ton; corn silage, $3 per ton.

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TABLE IX. *Showing selling value of cattle fed on different amounts of cottonseed meal with shelled corn, clover hay, and corn silage.*

RATION.	Lot 1.	Lot 5.
	Shelled corn, cottonseed meal 2.5 lbs. daily per 1000 lbs. live weight, clover hay (morning) corn silage (evening).	Shelled corn, cottonseed meal 1.25 lbs. daily per 1000 lbs. live weight, clover hay (morning), corn silage (evening).
Selling value in lot at end of trial.		
1909-'10	$7 25	$7 20
1910-'11	5 95	5 70

It will be noted that the cattle sold in 1909-'10 for practically the same price, thereby denoting approximately the same finish. There was a difference in 1910-'11, however, of 25 cents per hundred in favor of using the larger amount of cottonseed meal.

SUMMARY. Table X shows a summary of the results secured.

TABLE X. *Summary Part II—1.*

Date of experiment Length of experiment	Nov. 17, 1909—Apr. 26, 1910.① (160 days).		Nov. 18, 1910—Apr. 17, 1911.② (150 days).	
RATION.	Lot 1.	Lot 5.	Lot 1.	Lot 5.
	Shelled corn, cottonseed meal, clovey hay (morning), corn silage (evening).	Shelled corn, cottonseed meal, clover hay (morning), corn silage (evening).	Shelled corn, cottonseed meal, clover hay (morning), corn silage (evening).	Shelled corn, cottonseed meal, clover hay (morning), corn silage (evening).
Cottonseed meal daily per 1000 lbs. live weight	2.5 lbs.	1.25 lbs.	2.5 lbs.	1.25 lbs.
Initial value per cwt	$4 65	$4 65	$5 00	$5 00
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
Average initial weight	900	892.5	1,122.0	1,114.8
Average final weight	1,312.7	1,260.5	1,510.3	1,465.5
Total gain per steer	412.7	368.0	388.3	350.7
Average daily gain per steer	2.58	2.30	2.59	2.34
Total feed consumed:				
Shelled corn	24,520	24,610	27,393	27,850
Cottonseed meal	4,171.5	2,061	4,565	2,257.5
Clover hay	12,264	11,739	8,748	8,455
Corn silage	22,280	22,275	31,160	28,890
Average daily feed per steer:				
Shelled corn	15.33	15.38	18.26	18.57
Cottonseed meal	2.61	1.29	3.04	1.505
Clover hay	7.67	7.34	5.83	5.64
Corn silage	13.93	13.92	20.77	19.26
Feed consumed per lb. gain:				
Shelled corn	5.94	6.69	7 05	7.94
Cottonseed meal	1.02	.56	1.18	.64
Clover hay	2.97	3 19	2 25	2.41
Corn silage	5.40	6.05	8.02	8.24
Cost of gain per cwt	$9 76	$9 95	$8 82	$8 73
Necessary selling price	6 26	6 20	5 98	5 89
Selling value of cattle in feed lot, without shrinkage	7 25	7 20	5 95	5 70
Profit per steer (without pork)	13 02	12 62	(Loss) 50	(Loss) 2 82
Pork produced per lot	③900 lbs.	④1,005 lbs.	810 lbs.	805 lbs.
Profit per steer (including pork)	$21 04	$19 14	$4 36	$2 01

1. Pork valued at nine cents per pound, 1909-'10.
2. Pork valued at six cents per pound, 1910-'11.
3. 90 pounds of corn fed to hogs.
4. 2665 pounds of corn fed to hogs.

This summary is based on the price of feeds as follows: Shelled corn, 1909-'10, first month, 49.9 cents; second month, 55.7 cents; third month, 56.7 cents; fourth month, 53.7 cents; fifth month, 51.9 cents; last ten days, 50.2 cents per bushel. 1910-'11, shelled corn, first month, 36.1 cents; second month, 37 cents; third month, 37.8 cents; fourth month, 36.9 cents; and fifth month, 39.3 cents per bushel; cottonseed meal, $33 per ton in 1909-'10, and $30 per ton in 1910-'11; clover hay, $10 per ton; and corn silage, $3.50 per ton in 1909-'10, and $3 per ton in 1910-'11. No account of the straw used for bedding and labor of feeding is included. Neither is there any account of the manure produced.

The pork produced from the droppings is considered a part of the feeding operation and is added to the receipts from the cattle. There were usually five hogs in lot 1 of 1909-'10 and ten in lot 5 of the same year, the latter receiving some shelled corn in addition to the droppings. There were eight hogs in each lot in 1910-'11 and they received no grain, except in the droppings, after being placed in the feed lots. Pork is valued at nine cents per pound in 1909-'10 and six cents per pound in 1910-'11. The grain fed the hogs in lot 5 in 1909-'10 is valued at 53 cents per bushel and its cost is deducted from the value of the pork actually produced before the value of the pork produced from the droppings is accredited to the receipts from cattle.

The unusually large returns of 1909-'10 and the extremely small profits of 1910-'11 are due to the condition of the market at the end of the trials. The spring of 1910 saw an abnormally high market for all classes of meat animals, while, considering the cost of feeding cattle in the fall of 1910, the spring of 1911 witnessed a very dull and unsatisfactory market.

The summary shows the ration containing 2.5 pounds of cottonseed meal per 1000 pounds live weight to be more profitable than the one containing only half as much cottonseed meal. This was due quite largely to more rapid gain, because the cost of making gains was not greatly affected. The margin required to come out even was six cents in 1909-'10 and nine cents per hundred in 1910-'11 in favor of the smaller amount of cottonseed meal; but the cattle made sufficiently greater gain and sold for sufficiently higher price, where the larger amount of cottonseed meal was fed, to more than overcome the extra margin required. The difference in selling price was only five cents per hundred in 1909-'10, with the result that there was only 40 cents per steer difference in profit, not including pork; but in 1910-'11 there was a difference of 25 cents per hundred in selling price and a corresponding difference of $2.32 in loss per steer in favor of the heavier amount of cottonseed meal. When the pork produced from the droppings is considered the profit per steer was increased, by the use of the larger amount of cottonseed meal, $1.90 per steer in 1909-'10 and $2.35 per steer in 1910-'11.

2.—*Influence of Different Proportions of Cottonseed Meal in a Ration of Shelled Corn and Clover Hay.*

The influence of the different proportions of cottonseed meal on the appetites of the cattle is shown by table XI, which gives the average amount of feed consumed daily per steer.

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TABLE XI. *Showing average amount of feed consumed daily per head by fattening steers, winters 1909-'10 and 1910-'11.*

Date of experiment. Length of experiment.	Nov. 17, 1909—Apr. 26, 1910. (160 days.)		Nov. 18, 1910—Apr. 17, 1911. (150 days.)	
	Lot 2.	Lot 6.	Lot 2.	Lot 6.
RATION.	Shelled corn, cottonseed meal, clover hay.	Shelled corn, cottonseed meal, clover hay.	Shelled corn, cottonseed meal, clover hay.	Shelled corn, cottonseed meal, clover hay.
Cottonseed meal daily per 1,000 lbs. live weight	2.5 lbs.	1.25 lbs.	2.5 lbs.	1.25 lbs.
First month:	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*
Shelled corn	10 60	10.60	13.33	13.52
Cottonseed meal	1.79	.89	1.88	.95
Clover hay	14.77	14.96	15.82	15.98
Second month:				
Shelled corn	13.48	13.48	20.52	20.63
Cottonseed meal	2.40	1.20	2.87	1.46
Clover hay	12.01	12.41	9.73	9.85
Third month:				
Shelled corn	15.02	15.02	22.18	22.00
Cottonseed meal	2.48	1.26	3.18	1.58
Clover hay	12.00	12.00	10.00	10.00
Fourth month:				
Shelled corn	18.48	18.48	23.00	22.00
Cottonseed meal	2.80	1.40	3.35	1.67
Clover hay	10.99	11.20	10.00	10.00
Fifth month:				
Shelled corn	19.95	20.22	23.00	22.92
Cottonseed meal	2.96	1.50	3.57	1.77
Clover hay	9.79	9.96	9.50	10.00
Last 10 days:				
Shelled corn	19.90	19.90		
Cottonseed meal	3.00	1 50		
Clover hay	9 70	9.79		
Average of entire period:				
Shelled corn	15.78	15.83	20.41	20.21
Cottonseed meal	2.52	1.27	2.96	1.49
Clover hay	11.77	11.96	11.01	11.16

In 1909-'10 both lots were started on six pounds of shelled corn, which was gradually increased, until at the end of 30 days the steers were receiving 13 pounds of corn daily. Lot 2 was started on 0.5 pound and lot 6 on 0.25 pound of cottonseed meal daily per steer. This amount was gradually increased until at the end of 17 days lot 2 was receiving 2.4 pounds and lot 6 1.2 pounds daily per steer, after which time the amount fed was increased in proportion to the weights of the cattle.

In 1910-'11 the same method of starting on feed was employed as in 1909-'10. The corn was increased more rapidly, and the cattle of both lots were on full feed at the end of 17 days, when they were eating 18 pounds of shelled corn, and 2.8 and 1.4 pounds of cottonseed meal in lots 2 and 6, respectively.

Clover hay was the only roughage offered the cattle in any of the lots. Both lots were started on 20 pounds of clover hay daily per steer. This amount rapidly decreased until at the time the cattle were on full feed of grain the hay consumed daily per steer was 12 pounds in 1909-'10 and 16 pounds in 1910-'11. These amounts gradually decreased in 1909-'10 as

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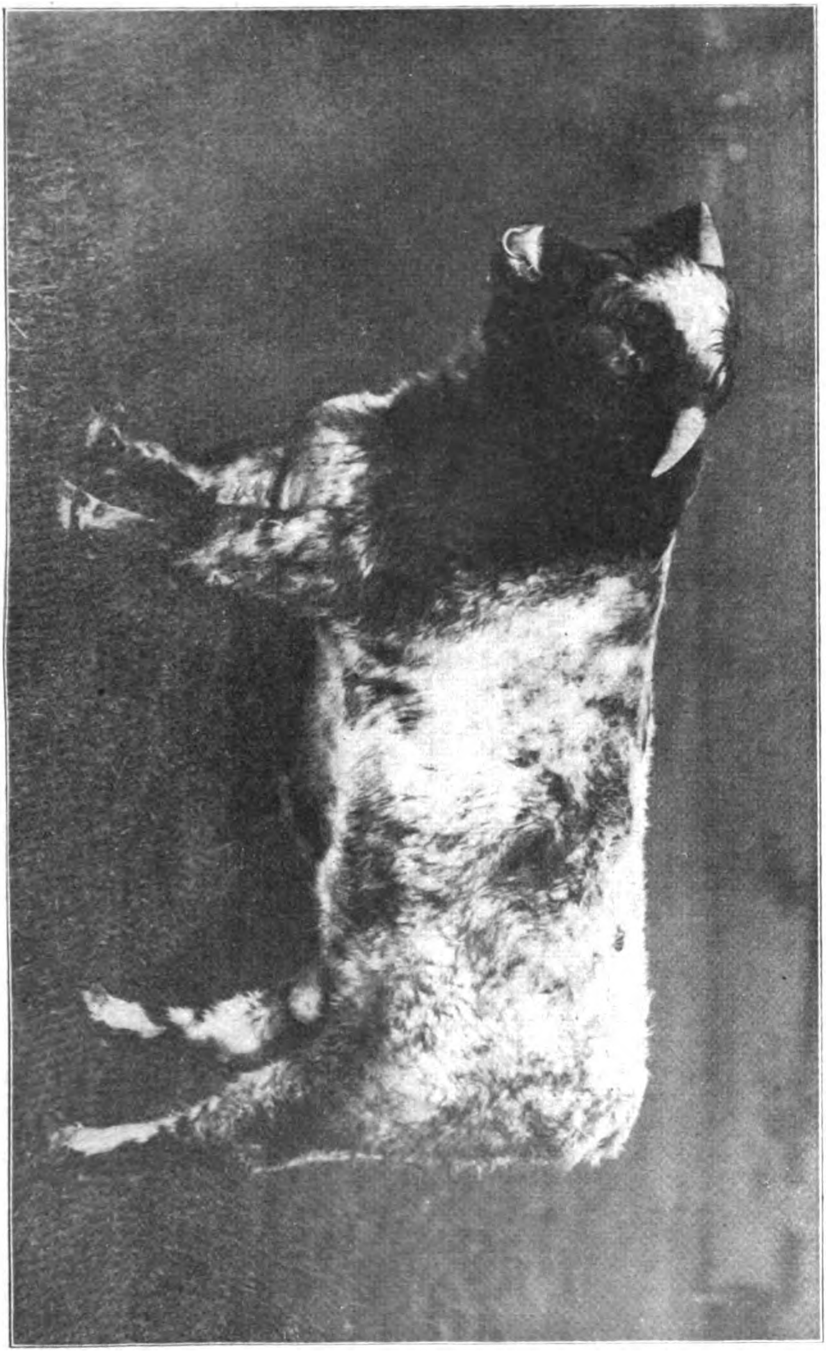

Short-horn bull calf Tongswood Romeo. Owned in England.

the cattle became fatter, but after decreasing to 10 pounds daily per steer in 1910-'11 the amount remained practically the same throughout the trial.

It will be noted that there was a marked similarity in the appetites of lots 2 and 6 in 1909-'10 for both corn and clover. The addition of the larger amount of cottonseed meal was not accompanied by a corresponding decrease in other feeds. In other words, the extra amount of cottonseed meal stimulated the appetites to such an extent that the larger amount of cottonseed meal was consumed in addition to the corn rather than as a substitute for it. In 1910-'11 the larger amount of cottonseed meal was not only consumed without decrease in the grain ration, but for a period of about six weeks covering the fourth month and parts of the third and fifth months stimulated the appetites of the steers to the consumption of a larger amount of corn.

GAINS. The effect of different proportions of cottonseed meal in a ration of corn and clover hay is shown by table XII, which gives the average daily and total gain per steer by months.

TABLE XII. *Showing average daily gain per steer by months, winters 1909-'10 and 1910-'11.*

Date of experiment.............. Length of experiment...........	Nov. 17, 1909—Apr. 26, 1910. (160 days.)		Nov. 18, 1910—Apr. 17, 1911. (150 days.)	
	Lot 2.	Lot 6.	Lot 2.	Lot 6.
RATION.	Shelled corn, cottonseed meal, clover hay.	Shelled corn, cottonseed meal, clover hay.	Shelled corn, cottonseed meal, clover hay.	Shelled corn, cottonseed meal, clover hay.
Cottonseed meal daily per 1000 pounds live weight............	2.5 lbs.	1.25 lbs.	2.5 lbs.	1.25 lbs.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
First month.....................	2.41	2.55	—0.04	0.74
Second month....................	1.43	1.33	3.40	2.70
Third month.....................	3.23	3.25	3.02	2.60
Fourth month....................	2.03	2.12	2.68	2.43
Fifth month.....................	1.96	1.83	3.11	3.27
Last ten days...................	3.30	3.05		
Total gain per steer..............	365.50	363.00	364.90	352.20
Average daily gain for entire period.....................	2.28	2.27	2.43	2.35

It will be noted that the rate of gain was practically identical in the two lots in 1909-'10; that while the monthly gains varied somewhat, the average for the entire period was the same. This was not the case, however, in 1910-'11. The sum of the first two months' gains was the same for both lots, but from that time lot 2 consumed more grain and the gain was correspondingly larger, so that the gain of this lot for the 150 days averaged slightly larger than that of lot 6.

COST OF GAINS. Table XIII shows the amount of feed consumed per pound gain and the cost per hundred pounds gain with feed at different prices.

Table XIII, on the feed required to make a pound of gain, shows that in both trials more corn and hay were required to make a pound of gain in lot 6 than in lot 2, but that much less cottonseed meal was required

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TABLE XIII. *Showing average amount of feed consumed per pound gain, and cost per 100 pounds gain with feeds at varying prices.*

Date of experiment.. Length of experiment	Nov. 17, 1909—Apr. 26, 1910. (160 days.)		Nov. 18, 1910—Apr. 17, 1911. (150 days.)		Average of two trials.	
	Lot 2.	Lot 6.	Lot 2.	Lot 6.	Lot 2.	Lot 6.
RATION.	Shelled corn, cottonseed meal, clover hay.	Shelled corn, cottonseed meal, clover hay.	Shelled corn, cottonseed meal, clover hay.	Shelled corn, cottonseed meal, clover hay.		
Cottonseed meal daily per 1000 pounds live weight	2.5 lbs.	1.25 lbs.	2.5 lbs.	1.25 lbs.	2.5 lbs.	1.25 lbs.
Feed per pound gain:	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*
Shelled corn	6.91	6.98	8.39	8.61	7.65	7.78
Cottonseed meal	1.10	.56	1.22	.63	1.16	.595
Clover hay	5.15	5.27	4.53	4.75	4.84	5.02
Cost per cwt. gain:						
Actual cost ①	$10 98	$10 21	$9 71	$9 10		
Corn at 50 cents per bushel ②	10 40	9 70	11 58	11 01	$10 99	$10 35
Corn at 40 cents per bushel ③	9 16	8 46	10 08	9 47	9 62	8 96

1. These figures are based on the following prices:

1909-'10: Shelled corn, first month, 49.9 cents; second month, 55.7 cents; third month, 56.7 cents; fourth month, 53.7 cents; fifth month, 51.9 cents; last 10 days, 50.2 cents; cottonseed meal, $33 per ton; clover hay, $10 per ton; corn silage, $3.50 per ton.

1910-'11: Shelled corn, first month, 36.1 cents; second month, 37 cents; third month, 37.8 cents; fourth month, 36.9 cents; fifth month, 39.3 cents per bushel; cottonseed meal, $30 per ton; clover hay, $10 per ton; corn silage, $3 per ton.

2. Clover hay, $10 per ton; cottonseed meal, $30 per ton; corn silage, $3.50 per ton.

3. Clover hay, $10 per ton; cottonseed meal, $30 per ton; corn silage, $3 per ton.

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for the same amount of gain. In view of the fact that the cottonseed meal is far the highest priced feed of the three, the cost of gains is noticeably influenced by the amount of it consumed. The cost of gains was greatly increased by the use of the larger amount of this concentrate. With corn at 50 cents per bushel and cottonseed meal at $30 per ton, the average of the two years' work shows that the cost of gains was increased 64 cents per 100 pounds by the use of the larger amount of cottonseed meal; and with corn at 40 cents per bushel, and other feeds at the same price, the increase in cost per 100 pounds gain by the use of the larger amount of cottonseed meal was 66 cents.

FINISH. The effect of the different proportions of cottonseed meal in the ration on the finish of the cattle is shown in table XIV, which gives the selling value of cattle.

TABLE XIV. *Showing selling value of cattle fed different proportions of cottonseed meal with shelled corn and clover hay.*

RATION.	Lot 2. Shelled corn, cottonseed meal 2.5 lbs. daily per 1000 lbs. live weight, clover hay.	Lot 6. Shelled corn, cottonseed meal 1.25 lbs. daily per 1000 lbs. live weight, clover hay.
Selling value in lot at end of trial:		
1909-'10	$7 30	$7 10
1910-'11	5 85	5 60
Selling value after short feed:		
1909-'10	7 20	7 10
1910-'11	5 50	5 50

The valuation of the cattle shows that in the opinion of the commission men, lot 2, fed the heavier amount of cottonseed meal, was better finished and should have sold for 20 cents per hundred more in 1909-'10 and 25 cents per hundred more in 1910-'11 than lot 6, fed the same ration, except that the cottonseed meal was fed in only half as large amounts. The valuation of the cattle 40 and 60 days before the end of the trial shows that the greatest improvement in condition of the cattle in lot 2 over those of lot 6 was in the latter part of the feeding period.

SUMMARY. Table XV shows a summary of the two years' work.

This summary is based on the actual price of feeds at the time the trials were conducted. (See page 238.) No account is taken of bedding, labor, or manure. The pork produced from the droppings is considered a part of the feeding operation and is added to the receipts from the cattle. There were usually five hogs in lot 2 of 1909-'10 and ten in lot 6 of the same year, the latter receiving some shelled corn in addition to the droppings. There were eight hogs in both lots in 1910-'11, and they received no grain after being placed in the feed lots except that found in the droppings. Pork is valued at nine cents per pound in 1909-'10 and six cents per pound in 1910-'11. The grain fed the hogs in 1909-'10 is valued at 53 cents per bushel, and its cost deducted from the value of the pork actually produced before the value of the pork produced from the droppings is accredited to the receipts of the cattle.

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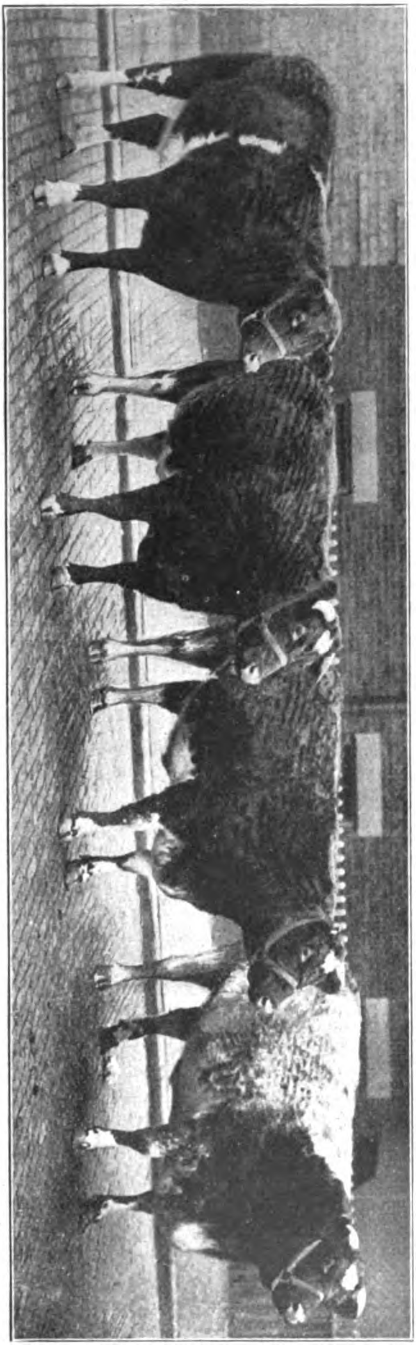

More Short-horns at their best.

TABLE XV. *Summary Part II—2.*

Date of experiment Length of experiment	Nov. 17, 1909—Apr. 26, 1910.① (160 days.)		Nov. 18, 1910—Apr. 17, 1911.② (150 days.)	
	Lot 2.	Lot 6.	Lot 2.	Lot 6.
RATION.	Shelled corn, cottonseed meal, clover hay.	Shelled corn, cottonseed meal, clover hay.	Shelled corn, cottonseed meal, clover hay.	Shelled corn, cottonseed meal, clover hay.
Cottonseed meal daily per 1000 pounds live weight	2.5 lbs.	1.25 lbs.	2.5 lbs.	1.25 lbs.
Initial value per cwt	$4 65	$4 65	$5 00	$5 00
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
Average initial weight	889.5	888.5	1,121.8	1,122.8
Average final weight	1,255	1,251.5	1,486.2	1,475
Total gain per steer	365.5	363	364.9	352.2
Average daily gain per steer	2.28	2.27	2.43	2.35
Total feed consumed:				
Shelled corn	25,250	25,800	30,610	30,320
Cottonseed meal	4,028.5	2,027	4,439.5	2,228.5
Clover hay	18,837	19,140	16,515	16,785
Average daily feed per steer:				
Shelled corn	15.78	15.88	20.41	20.21
Cottonseed meal	2.52	1.27	2.96	1.49
Clover hay	11.77	11.96	11.01	11.16
Feed consumed per pound gain:				
Shelled corn	6.91	6.98	8.39	8.61
Cottonseed meal	1.10	.56	1.22	.63
Clover hay	5.15	5.27	4.53	4.75
Cost of gain per cwt	$10 98	$10 21	$9 71	$9 10
Necessary selling price	6 49	6 26	6 16	5 98
Selling value of cattle in feed lots, without shrinkage	7 80	7 10	5 85	5 60
Profit per steer (without pork)	10 12	10 49	(Loss) 4 57	(Loss) 5 58
Pork produced per lot	③723 lbs.	④1,177 lbs.	1,005 lbs.	840 lbs.
Profit per steer (including pork)	$16 54	$18 56	$1 46	(Loss) $0 54

1. Pork valued at nine cents per pound in 1909-'10.
2. Pork valued at six cents per pound in 1910-'11.
3. 90 pounds of corn fed to hogs.
4. 2665 pounds of corn fed to hogs.

The unusually large returns in 1909-'10 and the extremely small profits of 1910-'11 are due to the condition of the market at the end of each trial. The spring of 1910 saw an abnormally high market for all classes of meat animals, while, considering the cost of feeding cattle in the fall of 1910, the spring of 1911 witnessed a very dull and unsatisfactory market.

The summary of the two years' work shows that the effect of using 2.5 pounds of cottonseed meal per 1000 pounds live weight, as compared with one-half that amount with corn and clover hay, was shown in only two factors—the cost of gains and the finish secured on the cattle. The rate of gain and the feed required to make a pound of gain was very little affected. The use of a larger proportion of high-priced feed in the form of cottonseed meal increased the cost of gains to quite an appreciable extent—77 cents per 100 pounds in 1909-'10, and 61 cents per 100 pounds in 1910-'11. The result of this increase in cost of gains was to increase the necessary selling price 24 cents in 1909-'10 and 18 cents in 1910-'11. In order to overcome this difference in margin required, the cattle on the heavy amount of cottonseed meal must of necessity sell higher. The increased selling price due to the heavier amount of cottonseed meal was 20 cents per cwt. the first year and 25 cents the second. The result was that the difference in selling price was not enough in 1909-'10 to overcome the extra cost of gains made by the heavy cottonseed-meal ration, which showed 37 cents per steer less profit that year than the lighter cottonseed-meal ration. The extra finish on the cattle and the fact that heavy cattle were fed in 1910-'11 was enough to overbalance the extra cost of gains, and there was a difference the latter year in returns per steer of $1.01 in favor of the heavy cottonseed-meal ration. It should be borne in mind, however, that two months before the end of the trials there was little difference in the finish of the two lots of cattle in either year; but from that time the heavier amount of cottonseed meal in the ration made a marked improvement in the finish of the cattle in this lot.

PART III. SHORT VS. LONG FEEDING.

During the past five years this station has conducted a series* of experiments with the view of obtaining information relating to the various factors involved in short and long feeding periods for fattening cattle. However, the question of the length of time to feed cattle depends on so many variable factors that it is impossible to draw definite conclusions. In addition to economic conditions bearing upon the problem, there are all the factors affecting beef production, such as market demands and prices; the supply, and the condition, quality and age of the cattle; the supply, relative and actual cost of grain, roughage, etc. It is obvious that feeding trials involving the question of a long or short feed are of value from an experimental standpoint only when the various influencing factors as they occurred in the trials are known and understood. Even when the influence of all other factors is understood, the effect of market prices which can not be determined in advance is so great that any definite conclusions in regard to the best system to follow under all conditions is impossible.

An illustration of the effect of market conditions is shown in the two lots of short-fed cattle of 1909-'10. On March 17, 1910, one lot of short-fed cattle was marketed and returned a profit, including pork, of more than $28 per steer, while the cattle used in the second trial, beginning March 17 and marketed 120 days later, returned a profit of less than $10 per head, notwithstanding the fact that the latter made more rapid and cheaper gains than have ever been made by any other lot of steers fed experimentally at this station. Part of this is due to the condition of the cattle when started on feed in the second trial, but it is due largely to the influence of the market conditions.

The kind of cattle should determine to a large extent the length of time to feed. In order to secure a reasonably good finish on cattle with a short feed, it is necessary that they not only carry considerable flesh when starting on feed, but also that they be well matured. The thinner and younger the cattle, other things being equal, the longer is the time required to finish them. Therefore, young cattle and cattle with little

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* Bulletins Nos. 129, 130, 142, 146.

flesh are, as a general rule, not satisfactory for the purpose of short feeding. The grade of the steer as a general rule should influence the degree of finish to which he should be carried. Steers of poor quality, that could not be made into prime finished cattle if fed indefinitely, should be sold before they have become excessively fat. Other conditions being equal, the last 100 pounds of gain required to make a steer prime are the most expensive gains put on the steer, and the increase in selling price must be correspondingly larger to insure profit from the additional finish. It is obvious, therefore, that the additional gain required to make a steer of high quality prime would not be profitable on a steer which would not sell above a medium price if finished, although it might prove exceedingly profitable on an animal capable of finishing into a prime steer that would bring the top of the market.

The relative supply and cost of grain and roughage to be disposed of is a factor which should, in a measure, determine the length of the feeding period. Cattle for short feeding are usually in higher condition at the beginning of the feeding period, and therefore the proportion of grain to roughage consumed is greater than with cattle fed for a longer period. Where feeders wish to dispose of large quantities of roughage the feeding period is necessarily longer than when a larger proportion of concentrates to roughage is to be fed. The study of the results of these trials will show the influence of a number of factors bearing on the question of the advantages of long and short feeding periods. Because the trials of 1909-'10 and 1910-'11 are so unlike, they are discussed separately with no attempt at correlation.

I.—Short vs. Long Feeding, 1909-'10.

CATTLE USED IN THE EXPERIMENT. The lot of long-fed cattle used in this comparison is the lot described as lot 3 in Part I. The short-fed cattle in lot 7 were heavier and somewhat fleshier steers than those used in the long-fed lot. They averaged 1056 pounds when started on feed November 17, 1909, while the long-fed lot averaged 897 pounds. The steers used in lot 8 were the light, thin, medium cattle which were left after the steers for the other seven lots had been selected. On November 23, 1909, these steers averaged 772 pounds. They were wintered on blue-grass pasture and cornstalk fields. On March 3, 1910, they were brought from the stalk fields, placed in the feed lot, and fed clover hay until March 17, when they were put into the experiment, averaging 805 pounds, and were valued at $6 per cwt.

Table XVI shows the average amount of feed consumed daily per steer. It will be noticed that with the exception of the first 30-day period, the short-fed steers consumed larger amounts of concentrates per head than the long-fed steers. The steers in each lot were started on a daily allowance of six pounds of shelled corn. In the long-fed lot this was gradually increased so that they were consuming 10 pounds per head at the end of the first 10 days, 12 pounds at the end of the second 10 days, and 12 pounds at the end of the first 30-day period, their average for the first 30 days being 10.6 pounds. Lot 7 was receiving 11.5 pounds of shelled corn per head at the end of the first 10 days. This seemed to be a little too much, considering the amount of roughage they were consum-

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TABLE XVI. *Showing average amount of feed consumed daily per head by long- and short-fed steers, winter 1909-'10.*

RATION.	Lot 3.	Lot 7.	Lot 8.
	Shelled corn, cottonseed meal, corn silage.	Shelled corn, cottonseed meal, corn silage.	Shelled corn, cottonseed meal, clover hay, corn silage.
First month:	*Pounds.*	*Pounds.*	*Pounds.*
Shelled corn	10.60	10.47	10.14
Cottonseed meal	1.79	1.78	1.63
Clover hay	....	....	3.57
Corn silage	31.07	36.89	35.51
Second month:			
Shelled corn	13 48	15.67	14.10
Cottonseed meal	2.40	2.82	2.14
Clover hay	....	....	2.75
Corn silage	31.74	33.31	36.52
Third month:			
Shelled corn	14.70	16.80	16.54
Cottonseed meal	2.52	2.97	2.39
Clover hay	....	....	1.61
Corn silage	30.00	33.33	35.88
Fourth month:			
Shelled corn	15.37	19.13	17.64
Cottonseed meal	2.87	3.29	2.79
Clover hay	....	....	1.59
Corn silage	28.23	25.44	27.31
Fifth month:			
Shelled corn	13.93		
Cottonseed meal	2.50		
Corn silage	21.48		
Last 10 days:			
Shelled corn	13.70		
Cottenseed meal	2 73		
Corn silage	15.20		
Average of entire period:			
Shelled corn	13.62	15.52	14.61
Cottonseed meal	2.44	2.72	2.24
Clover hay	....	....	2.38
Corn silage	27.67	32.24	33.81

ing, and a few of them went "off feed"; the allowance was reduced to 10 pounds per head until they all regained their appetites. This irregularity, due to a few of the steers going "off feed," brings down the average consumption of corn for lot 7 to 10.47 pounds per head for the first 30 days. The cattle in lot 8, which went on feed March 17 when the experiment with lot 7 closed, were much lighter than those in either of the other two lots, and their allowance of shelled corn was not increased quite so rapidly as was the case with lots 3 and 7. Their average consumption of corn for the first 30 days was 10.14 pounds. The initial allowance of cottonseed meal was one-half pound daily per steer in all lots; this was rapidly increased to approximately two and one-half pounds daily per 1000 pounds live weight, where it remained throughout the experiment. The table shows that from this time on the amount of concentrates consumed by the short-fed cattle increased more rapidly than it did in the long-fed lot. In the case of lot 7 this can be ascribed to the larger capacity of the heavier steers, but in the case of lot 8 it must have been due to either the kind of roughage fed or seasonal influence, because they were smaller

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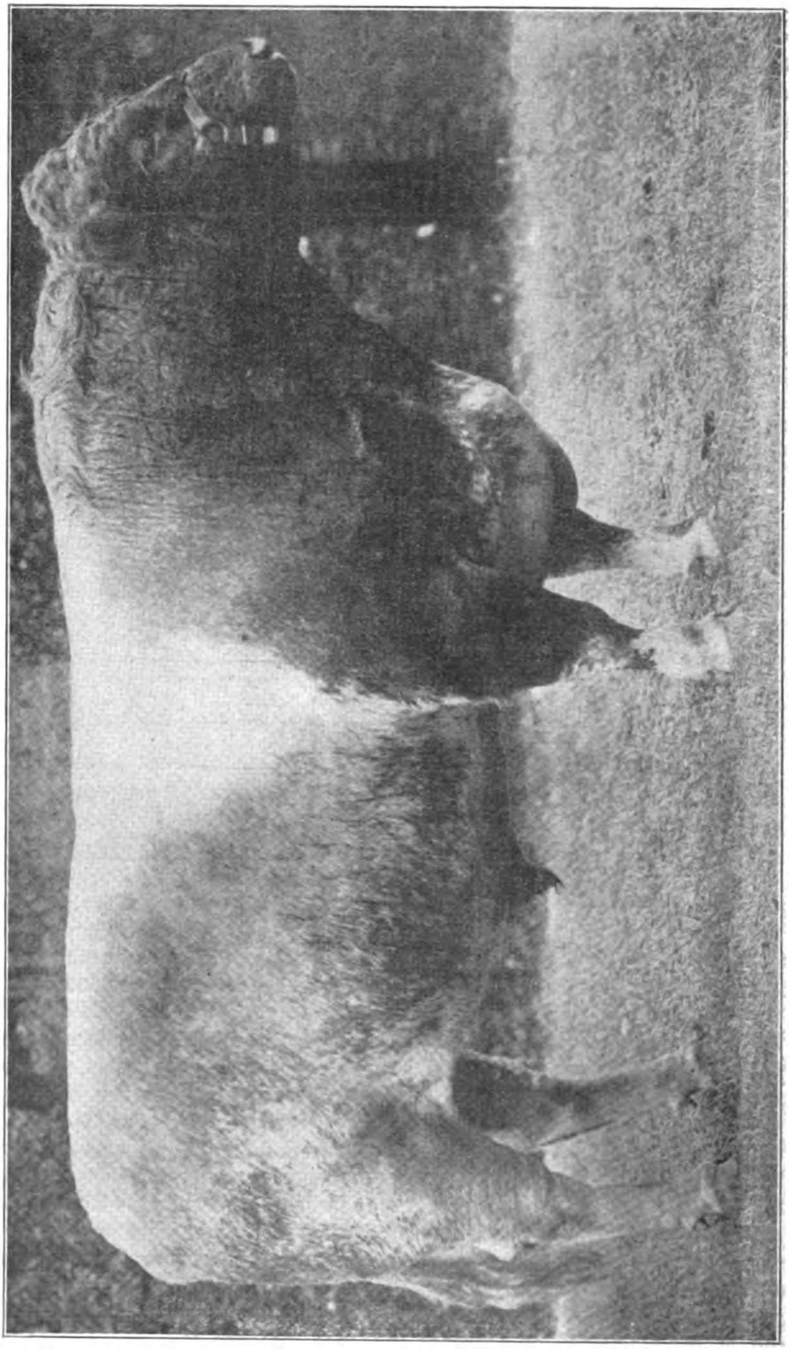

A champion Polled Durham bull.

than the steers in the long-fed lot. All of these steers were fed according to appetite. However, as the feeding period progressed, the amount of silage fed had to be reduced in order to increase the consumption of concentrates, but they always received as much as they would eat without decreasing their appetite for concentrates.

The entire roughage of lots 3 and 7 consisted of corn silage. Lot 3 was started on 24 pounds of silage per head daily, and the allowance was gradually increased so that they were getting 35 pounds per head by the end of the second week, where it remained until about the middle of the second 30-day period, when it began to gradually decrease as the consumption of concentrates increased.

Lot 7 was started on 40 pounds of corn silage per head and increased to 43.3 pounds per head at the end of the first week. A few days later some of the steers in this lot went "off feed" and the daily allowance of corn silage was reduced to about 27 pounds per head. After all the steers regained their appetites, the allowance was increased to 36.6 pounds per head, which was the largest amount of silage consumed after that time.

The roughage in lot 8 consisted of clover hay and corn silage; silage was fed twice daily in as large amounts as the steers would consume without reducing their appetites for grain. Clover hay was kept before them at all times. The table shows that the relative amounts of roughage consumed during the different 30-day periods correspond with that of the other two lots, being slightly greater in the second 30-day period, than in the first, and gradually decreasing after the second 30-day period, as the consumption of concentrates increased.

TABLE XVII. *Showing average daily gain per steer by months by long- and short-fed steers, winter 1909-'10*

	Lot 3. Long-fed.	Lot 3. Short-fed.	Lot 7. Short-fed.	Lot 8. Short-fed.
Number days fed	160	120	120	120
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
First month	2.36	2.36	2.16	4.18
Second month	1.86	1.86	2.50	3.43
Third month	3.53	3.53	3.47	2.87
Fourth month	2.15	2.15	2.04	2.29
Fifth month	1.60			
Last ten days	2.65			
Total gain per steer	372.00	297.50	305.60	383.10
Average daily gain for 120 days	....	2.48	2.55	3.19
Average daily gain for 160 days	2.33			

GAINS. Table XVII shows the average daily gain per steer by months and the total gain per head for steers in short *vs.* long feeding experiments. It will be noticed that both short-fed lots made more rapid gains than the long-fed lot. The average daily gain for the four-months period was 2.48 pounds in lot 3, 2.55 pounds in lot 7, and 3.19 pounds in lot 8. The difference between the gains made by lot 8 and the other two lots is quite large, and may be due to one or more of three factors: the thin condition of the steers when put on feed, the addition of a small amount of clover hay to the ration, or the more favorable weather conditions for fattening cattle. It will also be noticed that the average

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daily gain made by lot 3 for the 160-day period is considerably less than that for the 120-day period, showing that rate of gain decreases as the fattening period progresses.

COST OF GAINS. Table XVIII shows the amount of feed consumed per pound of gain and the cost per hundred pounds gain with feed at different prices.

TABLE XVIII. *Showing average amount of feed consumed per pound gain, and cost per 100 pounds gain with feeds at varying prices.*

RATION.	Lot 3.	Lot 3.	Lot 7.	Lot 8.
	Shelled corn, cottonseed meal, corn silage.	Shelled corn, cottonseed meal. corn silage.	Shelled corn, cottonseed meal, corn silage.	Shelled corn, cottonseed meal, clover hay, corn silage.
Number of days fed	160	120	120	120
Feed per pound gain:	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*
Shelled corn	5.86	5.46	6.09	4.58
Cottonseed meal	1.05	.96	1.07	.70
Clover hay		....	....	.75
Corn silage	11.90	12.20	12.66	10.59
Cost per cwt. gain:				
Actual cost	$9 42	$9 02	$9 89	$7 71
Corn at 50 cts. per bu	8 89	8 46	9 26	7 36
Corn at 40 cts. per bu	7 54	7 18	7 85	6 28

A study of table XVIII shows that the average amount of feed consumed per pound of gain was highest in lot 7 and lowest in lot 8. Since both these lots were short-fed, the cause can not be attributed to the length of the feeding period. It is clearly a case of the effect of condition on the rate and cost of gain. It is a well-known fact that the more nearly finished cattle are the slower is the rate and the higher the cost of gain. This is strikingly illustrated by lots 7 and 8. The cattle in lot 7 were heavy, fleshy feeders, while those in lot 8 were rather light and very thin, and in just the condition to make rapid and economical gains. In fact, the rate of gain in lot 8 was the highest and the feed requirements the lowest of any lot of cattle of similar age fed experimentally at this station. The effect of condition on gain is again shown in lot 3 by comparing gains of the first 120 days, and for the entire feeding period of 160 days. The rate of gain is higher and the cost of gain lower when a short feed only is considered than when they are based on the entire feeding period of 160 days. Since the steers used for short feeding are usually in higher condition than those to be fed for a long period, the cost of gains is very likely to be higher when all cattle are carried to the same degree of finish than when thinner cattle are fed. But it is also true that the latter part of the fattening period with all classes of cattle is likely to be the more expensive as regards cost of gains.

SUMMARY. Table XIX shows a complete summary of the results of the trials.

These figures are based upon the following prices for feeds: shelled corn, November 17 to December 17, 49.9 cents; December 17 to January 16, 55.7 cents; January 16 to February 15, 56.7 cents; February 15 to

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TABLE XIX. *Summary Part III—1. Winter 1909-'10.*

RATION.	Lot 3.	Lot 3.	Lot 7.	Lot 8.
	Shelled corn, cottonseed meal, corn silage.	Shelled corn, cottonseed meal, corn silage.	Shelled corn, cottonseed meal, corn silage.	Shelled corn, cottonseed meal, clover hay, corn silage.
Number of days fed	160	120	120	120
Initial value per cwt	$4 65	$4 65	$5 00	$6 00
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
Average initial weight	897.5	897.5	1,055.7	803.9
Average final weight	1,269.5	1,195	1,361.3	1,187
Total gain per steer	372	297.5	305.6	383.1
Average daily gain per steer	2.33	2.48	2.55	3.19
Total feed consumed:				
Shelled corn	21,795	16,245	27,930	26,292
Cottonseed meal	3,898.5	2,874.5	4,888	4,024
Clover hay	....	....	....	4,285
Corn silage	44,276	36,311	58,040	60,851
Average daily feed per steer:				
Shelled corn	13.62	13.54	15.52	14.61
Cottonseed meal	2.44	2.40	2.72	2.24
Clover hay	....	....	....	2.38
Corn silage	27.67	30.26	32.24	33.81
Feed consumed per pound gain:				
Shelled corn	5.86	5.46	6.09	4.58
Cottonseed meal	1 05	.96	1.07	.70
Clover hay	....	....	....	.75
Corn silage	11.90	12.20	12.66	10.59
Cost of gain per cwt	$9 42	$9 02	$9 80	$7 71
Necessary selling price	6 05	5 74	6 09	6 55
Necessary margin	1 40	1 09	1 09	55
Selling value of cattle in feed lots, without shrinkage	7 20	7 25	7 70	6 60
Profit per steer (without pork)	14 64	18 06	21 81	56
Pork produced per lot	① 620 lbs.	① 470 lbs.	② 1,270 lbs.	③ 1,735 lbs.
Profit per steer (including pork)	$20 14	$22 21	$28 15	$9 22

1. 90 pounds of shelled corn fed to hogs.
2. 2025 pounds of shelled corn fed to hogs.
3. 2770 pounds of shelled corn fed to hogs.

March 17, 53.7 cents; March 17 to April 16, 51.9 cents; April 16 to May 16, 52.9 cents; May 16 to June 15, 52.6 cents; June 15 to July 15, 54.2 cents per bushel; cottonseed meal, $33 per ton; clover hay, $10 per ton; corn silage, $3.50 per ton.

No account is taken of labor, bedding, or manure. The pork produced from the droppings is considered a part of the feeding operation and is added to the receipts of the cattle. There were usually five hogs in lot 3, 12 in lot 7, and 15 in lot 8, the hogs in the last two lots receiving some shelled corn in addition to the droppings. Pork is valued at nine cents per pound. The grain fed to the hogs is valued at 53 cents per bushel, and its cost is deducted from the value of the pork actually produced before the value of the pork produced from the droppings is accredited to the receipts of the cattle.

These trials were influenced so much by the peculiar market conditions that accurate comparisons of the two methods are very difficult. A comparison of the final valuations does not in any case indicate the relative degree of finish attained by the different lots, but it does indicate in a very lucid way the variations in the market and their bearing

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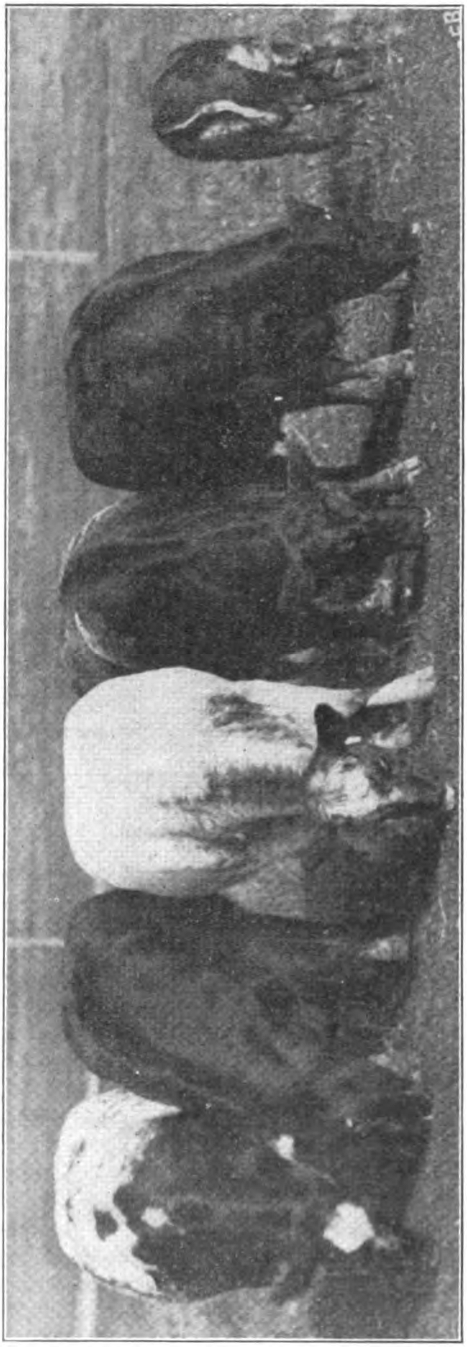

A group of prize-winning Polled Durhams.

upon the relative profits of short *vs.* long feeding periods. A comparison of the valuation placed on lot 3 at the end of the 120 days, and after 40 days' further feeding, shows that the price for fat cattle had dropped more than the value of the extra finish put on during that time amounted to, so that the last 40 days' feeding was at a loss of $3.42 per head. Lot 8, valued at $6 at the beginning of the trial, was sold on a still lower market than lot 3, and the result was that this lot, which made the most rapid and economical gain, produced the smallest profit.

A further study of the table shows that the margin between the necessary selling price and the final valuations at the end of the 120-day period was only 10 cents higher in lot 7 than lot 3, yet there is $3.75 difference in the profit per steer without pork, in favor of the larger cattle.

2.—Short vs. Long Feeding, 1910-'11.

The plan for short feeding this year was varied somewhat from that of previous years. Instead of the fattest and most mature steers being selected for short feeding as in previous years, the short-fed cattle of this year were equal in size, quality and condition with the long-fed cattle. The short-fed cattle during the first two months, instead of receiving grain as did the long-fed cattle, received clover hay and corn silage, without grain. After 60 days without grain the short-fed lot was fed on the same ration as the long-fed lot. This method of management placed the cattle of both lots on the same market, thus eliminating the factor of market fluctuations and variable demands.

The cattle used in the test were two- and three-year-old southern Indiana cattle.

Table XX shows the average amount of feed consumed daily per steer.

Lot 4 was started on six pounds of shelled corn, one-half pound of cottonseed meal, 24 pounds of silage, and 10 pounds of clover hay; the grain and silage being increased gradually, until within five days 42 pounds of silage were being consumed daily per steer. At the end of 17 days the cattle were on full feed of grain, at which time the daily ration contained 13 pounds of shelled corn, 2.8 pounds of cottonseed meal, 42 pounds of corn silage, and six pounds of clover hay. Lot 7 received 24 pounds of corn silage and 20 pounds of hay the first day. The silage was increased until at the end of five days, 42 pounds were being consumed. This amount remained constant for about 90 days. The clover hay consumed constantly decreased from the first, but remained almost stationary at about nine pounds daily during the second month. The first feed in the third month had five pounds of corn and one-half pound of cottonseed meal per steer added to the ration. The amount of grain was increased until within 11 days the cattle were on full feed. There was no decrease in the amount of silage for more than 30 days, but the clover hay consumed rapidly dropped to three pounds daily per steer, but again increased to four pounds after about two weeks of full feeding. After the cattle had been given grain for 30 days the amount of silage consumed gradually decreased until the end of the feeding period. The steers in lot 7 had good appetites until they had been on full feed 60 days, but at the end of this time they became slow about cleaning up and for two weeks they were indifferent about their eating, although they continued to consume as large quantities of feed.

TABLE XX. *Showing average amount of feed consumed daily per head by long- and short-fed steers, winter 1910-'11.*

RATION.	Lot 4.	Lot 7.
	Shelled corn, cottonseed meal, clover hay, corn silage (morning and evening).	Clover hay, corn silage, (first 60 days). Shelled corn, cottonseed meal, clover hay, corn silage (morning and evening), (last 90 days).
Number of days fed	150	150
First month:	*Pounds.*	*Pounds.*
Shelled corn	10.35	....
Cottonseed meal	1.79	....
Clover hay	5.65	13.05
Corn silage	39.07	39.70
Second month:		
Shelled corn	13.05	....
Cottonseed meal	2.97	....
Clover hay	4.38	9.12
Corn silage	30.00	42.00
Third month:		
Shelled corn	15.25	11.73
Cottonseed meal	3.20	2.92
Clover hay	4.00	3.73
Corn silage	30.00	42.00
Fourth month:		
Shelled corn	16.21	14.80
Cottonseed meal	3.41	3.28
Clover hay	4.30	3.87
Corn silage	29.09	38.70
Fifth month:		
Shelled corn	17.03	17.93
Cottonseed meal	3.64	3.48
Clover hay	4.15	2.53
Corn silage	26 81	29.73
Average of entire period:		
Shelled corn	14.38	8.89
Cottonseed meal	3.00	1.94
Clover hay	4.50	6.46
Corn silage	31.00	38.43

GAINS. Table XXI shows the average daily gain per steer by months and the total gain per steer.

It is noted that the first two months' gains in lot 7, while not as rapid as in lot 4, were about as satisfactory as could be expected when no grain is being fed. It was to be expected that the gains would not be large when the cattle were receiving no grain; but after the end of 60 days, at which time grain was added, the gains should have been more rapid. The table shows that the gains for the last 90 days were larger in lot 4, which had been on full feed for two months, than in lot 7, that had just been placed on feed. It is probable that the lack of gain in lot

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TABLE XXI. *Showing average daily gain per steer by months by long- and short-fed steers, winter 1910-'11.*

	Lot 4.	Lot 7.
	Long-fed.	Short-fed.
	Pounds.	*Pounds.*
First month	1.72	1.12
Second month	2.40	1.73
Third month	3.62	3.00
Fourth month	2.40	2.25
Fifth month	1.955	2.22
Total gain per steer	362.70	309.50
Average daily gain (entire period)	2.42	2.06
Average daily gain (first sixty days)	2.06	1.425
Average daily gain (last ninety days)	2.66	2.49

7 was due largely to the fact that the steers continued eating such large quantities of bulky, rough feed that not enough grain was consumed to insure rapid gain on steers carrying so much flesh.

COST OF GAINS. Table XXII shows the average amount of feed consumed per pound of gain, and the cost per 100 pounds gain with corn at different prices.

TABLE XXII. *Showing average amount of feed consumed per pound gain and cost per hundred pounds gain with feed at varying prices, winter 1910-'11.*

	Lot 4.	Lot 7.
	Long-fed.	Short-fed.
Feed per pound gain:	*Pounds.*	*Pounds.*
Shelled corn	5.95	4.31
Cottonseed meal	1.24	.94
Clover hay	1.86	3.13
Corn silage	12.82	18.62
Cost per cwt. gain:		
Actual cost	$8.71	$8.70
Corn at 50 cents per bushel	10.35	10.08
Corn at 40 cents per bushel	8.96	8.85

The table shows that the grain consumed per pound of gain was much less in lot 7, but that the roughage was correspondingly larger than in lot 4, so there was little saving in cost of gains in the short-fed lot when corn was as low as 40 cents per bushel. As grain advances in price, however, there would be a greater difference in cost of gains between the two lots. Also, since the gains were not nearly so large in lot 7, the total cost of feed was not nearly so great as in lot 4.

FINISH. The finish secured on the cattle in lot 7 is of much interest, since the advantage of such a method as was adopted in this lot lies in the fact that feeding cattle can be held for a short time on roughage alone in order to take advantage of a later market, provided conditions warrant it, and thus be full fed for a short time only.

Table XXIII shows the selling value of the cattle at the end of the experiment, and 60 days before the end of the experiment.

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Table XXIII. *Showing selling value of long- and short-fed cattle, winter 1910-'11.*

	Lot 4.	Lot 7.
	Long-fed.	Short-fed.
Selling value of cattle in lots at the end of experiment..........	$5 85	$5 60
Sixty days before the end of experiment........................	5 70	5 30

It will be noted that the short-fed lot did not acquire as good a finish by 25 cents per cwt. as did the long-fed lot. This difference in value was not as great, however, as had been the case two months before the end of the trial, when the values were 40 cents per cwt. different.

Summary. Table XXIV shows a complete summary of the results of the trial.

Table XXIV. *Summary Part III—2. Winter 1910-'11.*

	Lot 4.	Lot 7.
Ration.	Shelled corn, cottonseed meal, clover hay, corn silage (morning and evening).	Clover hay, corn silage, (first 60 days). Shelled corn, cottonseed meal, clover hay, corn silage (morning and evening), (last 90 days).
Number of days fed..	150	150
Initial value per cwt..	$5 00	$5 00
	Pounds.	*Pounds.*
Average initial weight..	1,116 90	1,122.50
Average final weight..	1,479.60	1,432.00
Total gain per steer..	362.70	309.50
Average daily gain per steer..	2.42	2 06
Total feed consumed:		
Shelled corn..	21,568.00	13,340.00
Cottonseed meal..	4.505.00	2,905.00
Clover hay..	6,753 00	9,690.00
Corn silage..	46,493.00	57,640.00
Average daily feed per steer:		
Shelled corn..	14.38	8.89
Cottonseed meal..	3.00	1.94
Clover hay..	4.50	6.46
Corn silage..	31.00	38.43
Feed consumed per pound gain:		
Shelled corn..	5.95	4.31
Cottonseed meal..	1.24	.94
Clover hay..	1.86	3.13
Corn silage..	12.82	18.62
Cost of gain per cwt..	$8 71	$8 70
Necessary selling price..	5 91	5 80
Selling value of cattle in feed lots, without shrinkage...........	5 85	5 60
Profit per steer (without pork)..	Loss, 86	Loss 2 86
Pork produced per lot..	650 lbs.	② 750 lbs.
Profit per steer (including pork)①..	$3 04	$0 71

1. Pork valued at six cents per pound.
2. 1387 pounds of shelled corn were fed in addition to droppings of cattle.

In the above summary the prices of feeds are given as they occurred during the progress of the experiment. Corn varied in price from 36.1 to 39.3 cents per bushel; cottonseed meal was $30 per ton; clover hay $10 per ton; corn silage $3 per ton. With an initial value of $5 per cwt. in the feed lot, and feed at the above-mentioned prices, it would have been necessary for lot 4 to sell for $5.91 per cwt. and lot 7 for $5.80 per cwt. in the feed lot in order to pay for the cattle and feed. In other words, a margin of 11 cents more was required for the long-fed than for the short-fed lot. There was a difference in selling value between the two lots, however, of 25 cents per cwt. in favor of lot 4, which reduced a loss of $2.86 per steer with the short-fed lot to 86 cents per steer in the full-fed lot.

When pork is considered, there was a profit of $3.04 per steer in the long-fed lot and of 71 cents per steer in the short-fed lot. It must be remembered, however, that the amount of pork produced can be greatly influenced by the addition of a small amount of grain and by the condition of the yards. The hogs in lot 4 received no extra grain after being placed in the lot with the steers. Those in lot 7, however, received 1387 pounds of shelled corn, all of which was fed before the cattle were placed on grain ration. There were eight hogs in lot 4 and seven in lot 7 until March 8, after which time both lots contained eight hogs. The value of the corn fed the hogs in lot 7, 37.4 cents per bushel, is deducted from the value of pork actually produced in the lot before the value of the pork produced from the droppings is accredited to the receipts from the cattle.

FINANCIAL STATEMENTS.

In order to present the economic phases of the experiments as completely as possible and to show in detail the methods of securing the figures used in the foregoing discussions, an itemized financial statement of each lot is given. The price of corn is based on the average prices paid by the Lafayette elevators during the different months of the trials. Cottonseed meal is valued at $33 per ton in 1909-'10 and $30 per ton in 1910-'11, which prices are slightly higher than was actually paid for this feed in carload lots. Clover hay is valued at $10 per ton; corn silage is valued at $3.50 per ton in 1909-'10 and $3 per ton in 1910-'11. No account is taken of the straw used for bedding nor of the labor of feeding; neither is any value assigned to the manure produced by the cattle.

In these financial statements the pork produced from the droppings is considered a by-product of the cattle-feeding operations, and its value is added to the profit of that operation. The number of hogs per lot was somewhat variable, as was made clear on page 325. When additional corn was fed the hogs, its cost at the current prices at the time was deducted from the value of the actual pork produced before the pork produced from the droppings was accredited to the returns of the cattle.

In order to permit more complete comparisons of the results the returns are stated in the following ways: total profit; profit per steer; and price received per bushel of corn fed. The profits of 1909-'10 are abnormally large, and it should be borne in mind that the cattle were sold on a much stronger market than the one on which they were bought. The profits of 1910-'11 were very small, but the cattle were sold on a relatively much lower market than the one on which the feeders were bought.

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LOT 1.—Ten steers fed shelled corn, cottonseed meal, clover hay, and corn silage (once daily), 1909-'10.

Nov. 17.—To 10 steers, weight 9000 lbs., at $4.65 per cwt.		$418 50
Nov. 17 to Dec. 17.—To 3180 lbs. shelled corn, at 49.9 c. per bu.		28 34
Dec. 17 to Jan. 16.—To 4045 lbs. shelled corn, at 55.7 c. per bu.		40 23
Jan. 16 to Feb. 15.—To 4485 lbs. shelled corn, at 56.7 c. per bu.		45 41
Feb. 15 to Mar. 17.—To 5260 lbs. shelled corn, at 53.7 c. per bu.		50 44
Mar. 17 to Apr. 16.—To 5695 lbs. shelled corn, at 51.9 c. per bu.		52 78
Apr. 16 to Apr. 26.—To 1855 lbs. shelled corn, at 50.2 c. per bu.		16 63
Nov. 17 to Apr. 26.—To 4171.5 lbs. cottonseed meal, at $33 per ton,		68 83
Nov. 17 to Apr. 26.—To 12,264 lbs. clover hay, at $10 per ton		61 32
Nov. 17 to Apr. 26.—To 22,280 lbs. corn silage, at $3.50 per ton		38 99
Total expenditures		$821 47
April 26.—By 10 steers, weight 13,127 lbs., at $7.25 per cwt.		951 71
Total profit, without pork		$130 24
Profit per steer, without pork		13 02
Nov. 17 to Nov. 27.—To 90 lbs. shelled corn, at 53 c. per bu.,	$0 85	
Nov. 17 to Apr. 26.—By 900 lbs. pork, at $9 per cwt.	81 00	
Value of pork produced from droppings		$80 15
Total receipts, including pork		1,031 86
Total profit, including pork		210 39
Profit per steer, including pork		21 04
Price received per bu. corn fed cattle		1 01

LOT 2.—Ten steers fed shelled corn, cottonseed meal, and clover hay, 1909-'10.

Nov. 17.—To 10 steers, weight 8895 lbs., at $4.65 per cwt.		$413 62
Nov. 17 to Dec. 17.—To 3180 lbs. shelled corn, at 49.9 c. per bu.		28 34
Dec. 17 to Jan. 16.—To 4045 lbs. shelled corn, at 55.7 c. per bu.		40 23
Jan. 16 to Feb. 15—To 4505 lbs. shelled corn, at 56.7 c. per bu.		45 61
Feb. 15 to Mar. 17.—To 5545 lbs. shelled corn, at 53.7 c. per bu.		53 17
Mar. 17 to Apr. 16.—To 5985 lbs. shelled corn, at 51.9 c. per bu.		55 47
Apr. 16 to Apr. 26.—To 1990 lbs. shelled corn, at 50.2 c. per bu.		17 84
Nov. 17 to Apr. 26.—To 4028.5 lbs. cottonseed meal, at $33 per ton,		66 47
Nov. 17 to Apr. 26.—To 18,837 lbs. clover hay, at $10 per ton		94 19
Total expenditures		$814 94
Apr. 26.—By 10 steers, weight 12,550 lbs., at $7.30 per cwt.		916 15
Total profit, without pork		$101 21
Profit per steer, without pork		10 12
Nov. 17 to Nov. 27.—To 90 lbs. shelled corn, at 53 c. per bu.,	$0 85	
Nov. 17 to Apr. 26.—By 723 lbs. pork, at $9 per cwt.	65 07	
Value of pork produced from droppings		$64 22
Total receipts, including pork		980 37
Total profit, including pork		165 43
Profit per steer, including pork		16 54
Price received per bu. corn fed cattle		90

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Lot 3.—Ten steers fed shelled corn, cottonseed meal, and corn silage, 1909-'10.

Nov. 17.—To 10 steers, weight 8975 lbs., at $4.65 per cwt.		$417 34
Nov. 17 to Dec. 17.—To 3180 lbs. shelled corn, at 49.9 c. per bu.		28 34
Dec. 17 to Jan. 16.—To 4045 lbs. shelled corn, at 55.7 c. per bu.		40 23
Jan. 16 to Feb. 15.—To 4410 lbs. shelled corn, at 56.7 c. per bu.		44 65
Feb. 15 to Mar. 17.—To 4610 lbs. shelled corn, at 53.7 c. per bu.		44 21
Mar. 17 to Apr. 16.—To 4180 lbs. shelled corn, at 51.9 c. per bu.		38 74
Apr. 16 to Apr. 26.—To 1370 lbs. shelled corn, at 50.2 c. per bu.		12 28
Nov. 17 to Apr. 26.—To 3898.5 lbs. cottonseed meal, at $33 per ton,		64 33
Nov. 17 to Apr. 26.—To 44,276 lbs. corn silage, at $3.50 per ton.		77 48
Total expenditures		$767 60
April 26.—By 10 steers, weight 12,695 lbs., at $7.20 per cwt.		914 04
Total profit, without pork		$146 44
Profit per steer, without pork		14 64
Nov. 17 to Nov. 27.—To 90 lbs. shelled corn, at 53 c. per bu.,	$0 85	
Nov. 17 to Apr. 26.—By 620 lbs. pork, at $9 per cwt.	55 80	
Value of pork produced from droppings		$54 95
Total receipts, including pork		968 99
Total profit, including pork		201 39
Profit per steer, including pork		20 14
Price received per bu. corn fed cattle		1 05

Lot 3.—(First 120 days, for comparison with short-fed lots) 1909-'10.

Nov. 17.—To 10 steers, weight 8975 lbs., at $4.65 per cwt.		$417 34
Nov. 17 to Dec. 17.—To 3180 lbs. shelled corn, at 49.9 c. per bu.		28 34
Dec. 17 to Jan. 16.—To 4045 lbs. shelled corn, at 55.7 c. per bu.		40 23
Jan. 16 to Feb. 15.—To 4410 lbs. shelled corn, at 56.7 c. per bu.		44 65
Feb. 15 to Mar. 17.—To 4610 lbs. shelled corn, at 53.7 c. per bu.		44 21
Nov. 17 to Mar. 17.—To 2874.5 lbs. cottonseed meal, at $33 per ton,		47 43
Nov. 17 to Mar. 17.—To 36,311 lbs. corn silage, at $3.50 per ton,		63 54
Total expenditures		$685 74
Mar. 12.—By 10 steers, weight 11,950 lbs., at $7.25 per cwt.		866 38
Total profit, without pork		$180 64
Profit per steer, without pork		18 06
Nov. 17 to Nov. 27.—To 90 lbs. shelled corn, at 53 c. per bu.,	$0 85	
Nov. 17 to Mar. 17.—By 470 lbs. pork, at $9 per cwt.	42 30	
Value of pork produced from droppings		$41 45
Total receipts, including pork		907 83
Total profits, including pork		222 09
Profit per steer, including pork		22 21
Price received per bu. corn fed cattle		1 31

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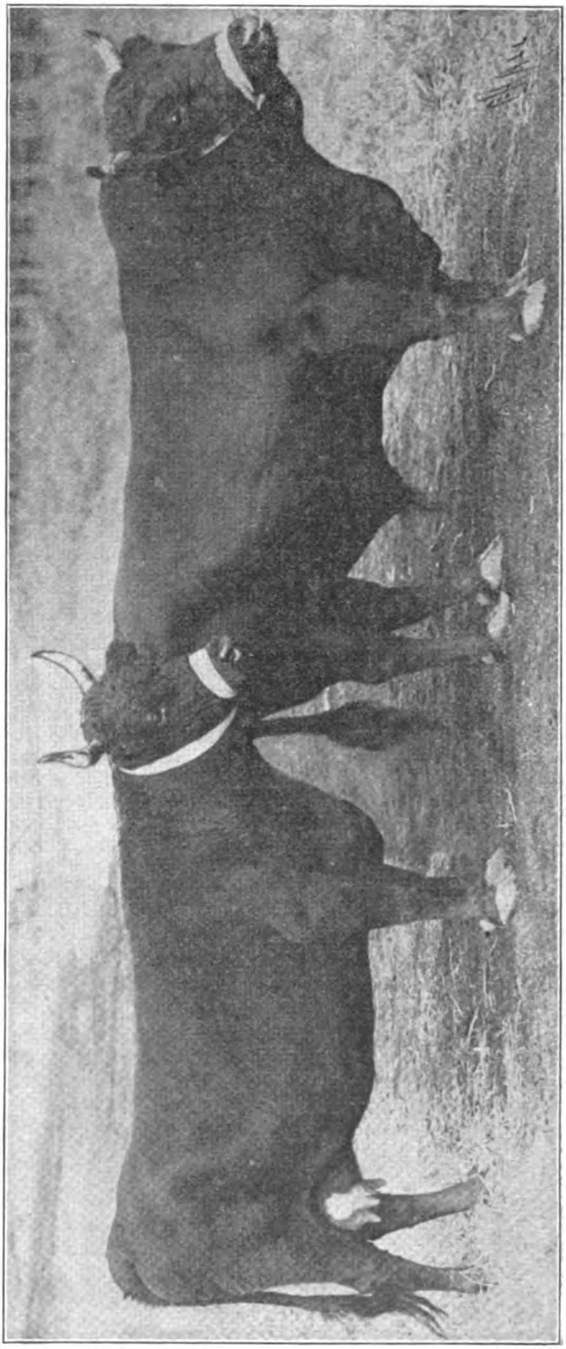

Prize-winning Kerry bull Tom Thumb, and cow Gort Queen.

Lot 4.—Ten steers fed shelled corn, cottonseed meal, clover hay and corn silage (twice daily), 1909-'10.

Nov. 17.—To 10 steers, weight 8925 lbs., at $4.65 per cwt.		$415 01
Nov. 17 to Dec. 17.—To 3180 lbs. shelled corn, at 49.9 c. per bu.,		28 34
Dec. 17 to Jan. 16.—To 4045 lbs. shelled corn, at 55.7 c. per bu.,		40 23
Jan. 16 to Feb. 15.—To 4410 lbs. shelled corn, at 56.7 c. per bu.,		44 65
Feb. 15 to Mar. 17.—To 4810 lbs. shelled corn, at 53.7 c. per bu.,		46 12
Mar. 17 to Apr. 16.—To 5075 lbs. shelled corn, at 51.9 c. per bu.,		47 03
Apr. 16 to Apr. 26.—To 1590 lbs. shelled corn, at 50.2 c. per bu.,		14 25
Nov. 17 to Apr. 26.—To 4134.5 lbs. cottonseed meal, at $33 per ton,		68 22
Nov. 17 to Apr. 26.—To 7086 lbs. clover hay, at $10 per ton.		35 43
Nov. 17 to Apr. 26.—To 44,418 lbs. corn silage, at $3.50 per ton,		77 73
Total expenditures		$817 01
April 26.—By 10 steers, weight 13,130 lbs., at $7.60 per cwt.		997 88
Total profit, without pork		$180 87
Profit per steer, without pork		18 09
Nov. 17 to Apr. 26.—To 2665 lbs. sh. corn, at 53 c. per bu.,	$25 22	
Nov. 17 to April 26.—By 1405 lbs. pork, at $9 per cwt.	126 45	
Value of pork produced from droppings		$101 23
Total receipts, including pork		1,099 11
Total profit, including pork		282 10
Profit per steer, including pork		28 21
Price received per bu. corn fed cattle		1 22

Lot 5.—Ten steers fed shelled corn, cottonseed meal, clover hay, and corn silage (once daily), 1909-'10.

Nov. 17.—To 10 steers, weight 8925 lbs., at $4.65 per cwt.		$415 01
Nov. 17 to Dec. 17.—To 3180 lbs. shelled corn, at 49.9 c. per bu.,		28 34
Dec. 17 to Jan. 16.—To 4045 lbs. shelled corn, at 55.7 c. per bu.,		40 23
Jan. 16 to Feb. 15.—To 4485 lbs. shelled corn, at 56.7 c. per bu.,		45 41
Feb. 15 to Mar. 17.—To 5250 lbs. shelled corn, at 53.7 c. per bu.,		50 34
Mar. 17 to Apr. 16.—To 5765 lbs. shelled corn, at 51.9 c. per bu.,		53 43
Apr. 16 to Apr. 26.—To 1885 lbs. shelled corn, at 50.2 c. per bu.,		16 90
Nov. 17 to Apr. 26.—To 2061 lbs. cottonseed meal, at $33 per ton,		34 01
Nov. 17 to Apr. 26.—To 11,739 lbs. clover hay, at $10 per ton.		58 70
Nov. 17 to Apr. 26.—To 22,275 lbs. corn silage, at $3.50 per ton,		38 98
Total expenditures		$781 35
April 26.—By 10 steers, weight 12,605 lbs., at $7.20 per cwt.		907 56
Total profit, without pork		$126 21
Profit per steer, without pork		12 62
Nov. 17 to Apr. 26.—To 2665 lbs. sh. corn, at 53 c. per bu.,	$25 22	
Nov. 17 to Apr. 26.—By 1005 lbs. pork, at $9 per cwt.	90 45	
Value of pork produced from droppings		$65 23
Total receipts, including pork		972 79
Total profit, including pork		191 44
Profit per steer, including pork		19 14
Price received per bu. corn fed cattle		97

LOT 6.—Ten steers fed shelled corn, cottonseed meal, and clover hay, 1909-'10.

Nov. 17.—To 10 steers, weight 8885 lbs., at $4.65 per cwt.		$413 15
Nov. 17 to Dec. 17.—To 3180 lbs. shelled corn, at 49.9 c. per bu.,		28 34
Dec. 17 to Jan. 16.—To 4045 lbs. shelled corn, at 55.7 c. per bu.,		40 23
Jan. 16 to Feb. 15.—To 4505 lbs. shelled corn, at 56.7 c. per bu.,		45 61
Feb. 15 to Mar. 17.—To 5545 lbs. shelled corn, at 53.7 c. per bu.,		53 17
Mar. 17 to Apr. 16.—To 6065 lbs. shelled corn, at 51.9 c. per bu.,		56 21
Apr. 16 to Apr. 26.—To 1990 lbs. shelled corn, at 50.2 c. per bu.,		17 84
Nov. 17 to Apr. 26.—To 2027 lbs. cottonseed meal, at $33 per ton,		33 45
Nov. 17 to Apr. 26.—To 19,140 lbs. clover hay, at $10 per ton		95 70
Total expenditures		$783 70
April 26.—By 10 steers, weight 12,515 lbs., at $7.10 per cwt.		888 57
Total profit, without pork		$104 87
Profit per steer, without pork		10 49
Nov. 17 to Apr. 26.—To 2665 lbs. sh. corn, at 53 c. per bu.,	$25 22	
Nov. 17 to Apr. 26.—By 1177 lbs. pork, at $9 per cwt.	105 93	
Value of pork produced from droppings		$80 71
Total receipts, including pork		969 28
Total profit, including pork		185 58
Profit per steer, including pork		18 56
Price received per bu. corn fed cattle		94

LOT 7.—Fifteen steers short-fed, winter 1909-'10.

Nov. 17.—To 15 steers, weight 15,835 lbs., at $5 per cwt.		$791 75
Nov. 17 to Dec. 17.—To 4710 lbs. shelled corn, at 49.9 c. per bu.,		41 97
Dec. 17 to Jan. 16.—To 7050 lbs. shelled corn, at 55.7 c. per bu.,		70 12
Jan. 16 to Feb. 15.—To 7560 lbs. shelled corn, at 56.7 c. per bu.,		76 55
Feb. 15 to Mar. 17.—To 8610 lbs. shelled corn, at 53.7 c. per bu.,		82 56
Nov. 17 to Mar. 17.—To 4888 lbs. cottonseed meal, at $33 per ton,		80 65
Nov. 17 to Mar. 17.—To 58,040 lbs. corn silage, at $3.50 per ton,		101 57
Total expenditures		$1,245 17
March 17.—By 15 steers, weight 20,420 lbs., at $7.70 per cwt.		1,572 34
Total profit, without pork		$327 17
Profit per steer, without pork		21 81
Nov. 17 to Mar. 17.—To 2025 lbs. sh. corn, at 54 c. per bu.,	$19 53	
Nov. 17 to Mar. 17.—By 1270 lbs. pork, at $9 per cwt.	114 30	
Value of pork produced from droppings		$94 77
Total receipts, including pork		1,667 11
Total profit, including pork		421 94
Profit per steer, including pork		28 13
Price received per bu. corn fed cattle		1 39

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Lot 8.—Fifteen steers short-fed, spring 1910.

Mar. 17.—To 15 steers, weight 12,058.3 lbs., at $6 per cwt......		$723 50
Mar. 17 to Apr. 16.—To 4565 lbs. shelled corn, at 51.9 c. per bu.,		42 31
Apr. 16 to May 16.—To 6345 lbs. shelled corn, at 52.9 c. per bu.,		59 94
May 16 to June 15.—To 7442 lbs. shelled corn, at 52.6 c. per bu.,		69 90
June 15 to July 15.—To 7940 lbs. shelled corn, at 54.2 c. per bu.,		76 85
Mar. 17 to July 15.—To 4024 lbs. cottonseed meal, at $33 per ton,		66 40
Mar. 17 to July 15.—To 4285 lbs. clover hay, at $10 per ton....		21 43
Mar. 17 to July 15.—To 60,851 lbs. corn silage, at $3.50 per ton,		106 49
Total expenditures		$1,166 82
July 15.—By 15 steers, weight 17,806 lbs., at $6.60 per cwt.....		1,175 20
Total profit, without pork..............................		$8 38
Profit per steer, without pork..............................		56
Mar. 17 to July 15.—To 2770 lbs. sh. corn, at 52.9 c. per bu.,	$26 17	
Mar. 17 to July 15.—By 1735 lbs. pork, at $9 per cwt...	156 15	
Value of pork produced from droppings..............		$129 98
Total receipts, including pork..........................		1,305 18
Total profit, including pork..............................		138 36
Profit per steer, including pork..........................		9 22
Price received per bu. corn fed cattle......................		83

Lot 1.—Ten steers fed shelled corn, cottonseed meal, and clover hay, and corn silage (once daily), 1910-'11.

Nov. 18.—To 10 steers, weight 11,220 lbs., at $5 per cwt........	$561 00
Nov. 18 to Dec. 18.—To 3940 lbs. shelled corn, at 36.1 c. per bu.,	25 40
Dec. 18 to Jan. 17.—To 5415 lbs. shelled corn, at 37 c. per bu.,	35 78
Jan. 17 to Feb. 16.—To 5775 lbs. shelled corn, at 37.8 c. per bu.,	38 98
Feb. 16 to Mar. 18.—To 6000 lbs. shelled corn, at 36.9 c. per bu.,	39 54
Mar. 18 to Apr. 17.—To 6263 lbs. shelled corn, at 39.3 c. per bu.,	43 95
Nov. 18 to Apr. 17.—To 4565 lbs. cottonseed meal, at $30 per ton,	68 48
Nov. 18 to Apr. 17.—To 8748 lbs. clover hay, at $10 per ton....	43 74
Nov. 18 to Apr. 17.—To 31,160 lbs. corn silage, at $3 per ton....	46 74
Total expenditures	$903 61
April 17.—By 10 steers, weight 15,103 lbs., at $5.95 per cwt.....	898 63
Total loss, without pork..............................	$4 98
Loss per steer, without pork..............................	50
Nov. 18 to Apr. 17.—By 810 lbs. pork, at $6 per cwt...........	$48 60
Total receipts, including pork..........................	947 23
Total profit, including pork..............................	43 62
Profit per steer, including pork..........................	4 36
Price received per bu. corn fed cattle......................	46

Lot 2.—Ten steers fed shelled corn, cottonseed meal, and clover hay, 1910-'11.

Nov. 18.—To 10 steers, weight 11,213 lbs., at $5 per cwt.	$560	65
Nov. 18 to Dec. 18.—To 4000 lbs. shelled corn, at 36.1 c. per bu.,	25	79
Dec. 18 to Jan. 17.—To 6155 lbs. shelled corn, at 37 c. per bu.,	40	67
Jan. 17 to Feb. 16.—To 6655 lbs. shelled corn, at 37.8 c. per bu.,	44	92
Feb. 16 to Mar. 18.—To 6900 lbs. shelled corn, at 36.9 c. per bu.,	45	47
Mar. 18 to Apr. 17.—To 6900 lbs. shelled corn, at 39.3 c. per bu.,	48	42
Nov. 18 to Apr. 17.—To 4439.5 lbs. cottonseed meal, at $30 per ton,	66	59
Nov. 18 to Apr. 17.—To 16,515 lbs. clover hay, at $10 per ton.	82	58
Total expenditures	$915	09
Apr. 17.—By 10 steers, weight 14,862 lbs., at $5.85 per cwt.	869	43
Total loss, without pork	$45	66
Loss per steer, without pork	4	57
Nov. 18 to Apr. 17.—By 1005 lbs. pork, at $6 per cwt.	$60	30
Total receipts, including pork	929	73
Total profit, including pork	14	64
Profit per steer, including pork	1	46
Price received per bu. corn fed cattle		40

Lot 3.—Ten steers fed shelled corn, cottonseed meal, and corn silage. 1910-'11.

Nov. 18.—To 10 steers, weight 11,210 lbs., at $5 per cwt.	$560	50
Nov. 18 to Dec. 18.—To 3365 lbs. shelled corn, at 36.1 c. per bu.,	21	69
Dec. 18 to Jan. 17.—To 4215 lbs. shelled corn, at 37 c. per bu.,	27	85
Jan. 17 to Feb. 16.—To 4482 lbs. shelled corn, at 37.8 c. per bu.,	30	25
Feb. 16 to Mar. 18.—To 4585 lbs. shelled corn, at 36.9 c. per bu.,	30	21
Mar. 18 to Apr. 17.—To 5380 lbs. shelled corn, at 39.3 c. per bu.,	37	76
Nov. 18 to Apr. 17.—To 4563.5 lbs. cottonseed meal, at $30 per ton,	68	45
Nov. 18 to Apr. 17.—To 57,255 lbs. corn silage, at $3 per ton.	85	88
Total expenditures	$862	59
April 17.—By 10 steers, weight 14,768 lbs., at $5.75 per cwt.	849	16
Total loss, without pork	$13	43
Loss per steer, without pork	1	34
Nov. 18 to Apr. 17.—By 790 lbs. pork, at $6 per cwt.	$47	40
Total receipts, including pork	896	56
Total profit, including pork	33	97
Profit per steer, including pork	3	40
Price received per bu. corn fed cattle		46

LOT 5.—Ten steers fed shelled corn, cottonseed meal, clover hay, and corn silage (twice daily), 1910-'11.

Nov. 18.—To 10 steers, weight 11,169 lbs., at $5 per cwt.	$558 45
Nov. 18 to Dec. 18.—To 3105 lbs, shelled corn, at 36.1 c. per bu.	20 02
Dec. 18 to Jan. 17.—To 3915 lbs. shelled corn, at 37 c. per bu.	25 87
Jan. 17 to Feb. 16.—To 4575 lbs. shelled corn, at 37.8 c. per bu.	30 88
Feb. 16 to Mar. 18.—To 4864 lbs. shelled corn, at 36.9 c. per bu.	32 05
Mar. 18 to Apr. 17.—To 5109 lbs. shelled corn, at 39.3 c. per bu.	35 85
Nov. 18 to Apr. 17.—To 4505 lbs. cottonseed meal, at $30 per ton,	67 58
Nov. 18 to Apr. 17.—To 6753 lbs. clover hay, at $10 per ton	33 77
Nov. 18 to Apr. 17.—To 46,493 lbs. corn silage, at $3 per ton	69 74
Total expenditures	$874 21
April 17.—By 10 steers, weight 14,796 lbs., at $5.85 per cwt.	865 57
Total loss, without pork	$8 64
Loss per steer, without pork	86
Nov. 18 to Apr. 17.—By 650 lbs. pork, at $6 per cwt	$39 00
Total receipts, including pork	904 57
Total profit, including pork	30 36
Profit per steer, including pork	3 04
Price received per bu. corn fed cattle	45

LOT 5.—Ten steers fed shelled corn, cottonseed meal, clover hay, and corn silage (once daily), 1910-'11.

Nov. 18.—To 10 steers, weight 11,148 lbs., at $5 per cwt.	$557 40
Nov. 18 to Dec. 18.—To 4005 lbs. shelled corn, at 36.1 c. per bu.	25 82
Dec. 18 to Jan. 17.—To 5570 lbs. shelled corn, at 37 c. per bu.	36 80
Jan. 17 to Feb. 16.—To 6000 lbs. shelled corn, at 37.8 c. per bu.	40 50
Feb. 16 to Mar. 18.—To 6000 lbs. shelled corn, at 36.9 c. per bu.	39 54
Mar. 18 to Apr. 17.—To 6275 lbs. shelled corn, at 39.3 c. per bu.	44 04
Nov. 18 to Apr. 17.—To 2257.5 lbs. cottonseed meal, at $30 per ton,	33 86
Nov. 18 to Apr. 17.—To 8455 lbs. clover hay, at $10 per ton	42 28
Nov. 18 to Apr. 17.—To 28,890 lbs. corn silage, at $3 per ton	43 34
Total expenditures	$863 58
Apr. 17.—By 10 steers, weight 14,655 lbs., at $5.70 per cwt.	835 34
Total loss, without pork	$28 24
Loss per steer, without pork	2 82
Nov. 18 to Apr. 17.—By 805 lbs. pork, at $6 per cwt	$48 30
Total receipts, including pork	883 64
Total profit, including pork	20 06
Profit per steer, including pork	2 01
Price received per bu. corn fed cattle	42

LOT 6.—Ten steers fed shelled corn, cottonseed meal, and clover hay, 1910-'11.

Nov. 18.—To 10 steers, weight 11,228 lbs., at $5 per cwt.	$561 40
Nov. 18 to Dec. 18.—To 4055 lbs. shelled corn, at 36.1 c. per bu.	26 14
Dec. 18 to Jan. 17.—To 6190 lbs. shelled corn, at 37 c. per bu.	40 90
Jan. 17 to Feb. 16.—To 6600 lbs. shelled corn, at 37.8 c. per bu.	44 55
Feb. 16 to Mar. 18.—To 6600 lbs. shelled corn, at 36.9 c. per bu.	43 49
Mar. 18 to Apr. 17.—To 6875 lbs. shelled corn, at 39.3 c. per bu.	48 25
Nov. 18 to Apr. 17.—To 2228.5 lbs. cottonseed meal, at $30 per ton,	33 43
Nov. 18 to Apr. 17.—To 16,735 lbs. clover hay, at $10 per ton	83 68
Total expenditures	$881 84
April 17.—By 10 steers, weight 14,750 lbs., at $5.60 per cwt.	826 00
Total loss, without pork	$55 84
Loss per steer, without pork	5 58
Nov. 18 to Apr. 17.—By 840 lbs. pork, at $6 per cwt.	$50 40
Total receipts, including pork	876 40
Total loss, including pork	5 44
Loss per steer, including pork	54
Price received per bu. corn fed cattle	37

LOT 7.—Ten steers, short-fed, 1910-'11.

Nov. 18.—To 10 steers, weight 11,225 lbs., at $5 per cwt.		$561 25
Jan. 17 to Feb. 16.—To 3520 lbs. shelled corn, at 37.8 c. per bu.		23 76
Feb. 16 to Mar. 18.—To 4440 lbs. shelled corn, at 36.9 c. per bu.		29 26
Mar. 18 to Apr. 17.—To 5380 lbs. shelled corn, at 39.3 c. per bu.		37 76
Jan. 17 to Apr. 17.—To 2905 lbs. cottonseed meal, at $30 per ton,		43 58
Nov. 18 to Apr. 17.—To 9690 lbs. clover hay, at $10 per ton		48 45
Nov. 18 to Apr. 17.—To 57,640 lbs. corn silage, at $3 per ton		86 46
Total expenditures		$830 52
April 17.—By 10 steers, weight 14,320 lbs., at $5.60 per cwt.		801 92
Total loss, without pork		$28 60
Loss per steer, without pork		2 86
Nov. 28 to Jan. 27.—To 1387 lbs. shelled corn, at 37.4 c. bu.,	$9 26	
Nov. 18 to Apr. 17.—By 750 lbs. pork, at $6 per cwt.	45 00	
Value of pork produced from droppings		$35 74
Total receipts, including pork		837 66
Total profit, including pork		7 14
Profit per steer, including pork		71
Price received per bu. corn fed cattle		41

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SUCCESS IN HOG RAISING.

By JOHN COWNIE, Des Moines, Iowa, in *Farm and Fireside*.

It is now over fifty years since I embarked in the business of pork production. I had earned two dollars and fifty cents by helping neighbors at thrashing, and invested this amount in two pigs. My first sale consisted of five hogs averaging 198 pounds each, dressed. All hogs were sold dressed at that time.

The price was $2 per hundredweight for hogs weighing over two hundred pounds, and $1.75 for those weighing less than two hundred pounds. Mine were the $1.75 kind. They were the real bacon hogs, so much prized now but not appreciated at that time. The buyer, in looking over the lot, picked up the smallest one by the tail—they all had large tails and heads—and asked me if it was not a codfish. I was not discouraged, but kept right on until I stood in Chicago stockyards and saw one shipment of hogs, all but one a stag, my own raising, cross the scales at the highest price paid that day, and I had checks for over $6000 in my pocket.

In feeding cattle there was often very little profit, and at times heavy losses. But I always depended upon the hogs to help me out. Financially, the hog has been my best friend, and for that reason I like hogs.

With the foregoing by way of introduction, I will now refer briefly to the methods which brought success to me in the work. And even the mistakes that I made, resulting in serious losses, may prove of value to those who, like myself, desire to profit from the experiences that others have had.

In the first place, a good hog house is absolutely necessary. In my first efforts, I sustained severe losses from lack of proper accommodations, especially at farrowing time. The shoats would pile up and smother in severe cold weather.

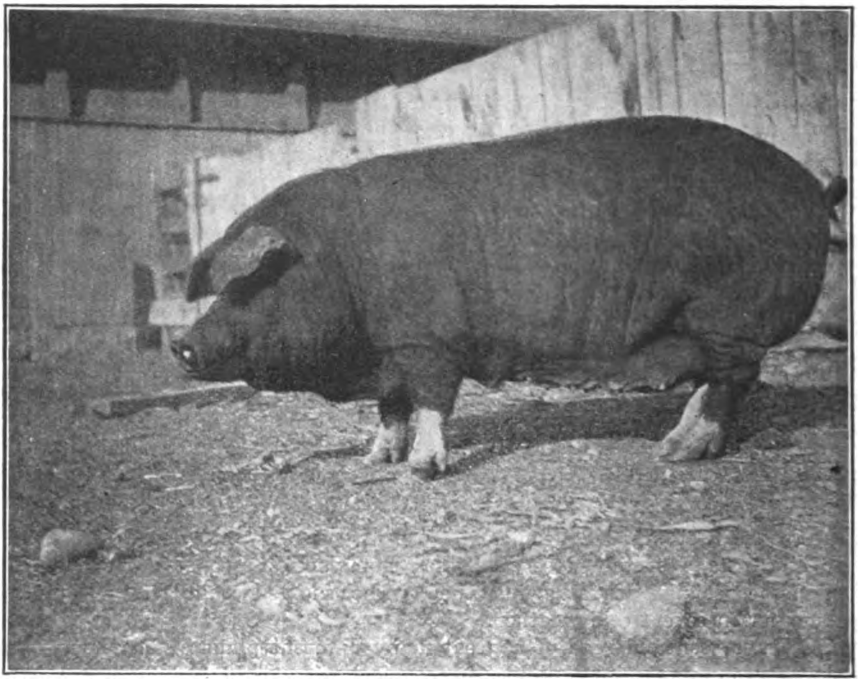
I have seen and read of a great many different plans of hog houses, but my preference is a building twenty feet wide, eight feet high on the sides, any desired length, with a roof one-third pitch, no floor above, and with a lower window in each gable to insure good ventilation and at the same time keep out rain. The building should stand north and south, thus securing sunlight in the forenoon on the east, and in the afternoon on the west. There should be a door in each end, and if cut in two crosswise the upper half can be left open for ventilation when required.

THE INSIDE PLAN.

Have an aisle, or alley, in the center, four feet wide, extending the full length of the building, with pens on each side six feet by eight feet. A gate to each pen is ideal for farrowing, and also when fattening the hogs, as there will not be any piling up in cold weather, the pen preventing crowding.

Next to the alley six-inch boards can be used, properly spaced and somewhat near the bottom, to prevent small pigs from creeping out, and wider apart toward the top, which should be about three feet above the floor.

Partitions between pens should be nailed close, to prevent quarreling among neighbors. If space is left between the boards, the openings make a ladder for the hogs, in which they place their front feet and scold each other, either through the opening or over the top of the partition. This precaution is particularly necessary with brood-sows, especially when quiet and rest is to be desired.



A Poland-China sow in pasture condition.

The hog house should be set on pillars of stone, brick or concrete, and the floor should be made of boards placed about two feet aboveground, to insure good ventilation beneath. This keeps the floor dry, a necessary requisite for the good health of the herd. A concrete floor placed on the ground is always damp, which is not conducive to comfort. With good bedding on the board floor there is no danger from cold.

To insure a clean hog house regular habits must be taught the shoats. Get them out early in the morning, so that all excrement may be deposited outside the building. A good pasture field is also indispensable for success in swine raising. It should be of good size, say an acre for each five hogs, and well stocked, preferably with red clover. Two or more fields should be fenced hog-tight to allow a rotation in crops. An excellent

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corn crop is always insured from a field which has been used for a hog pasture two or three years. It should never be used longer. Plowing and thorough cultivation, with exposure to the sun's rays, is necessary to purify the soil.

EXERCISE CARE IN SELECTING BROOD SOWS.

All breeds of hogs now common are good. It matters little what breed is selected, this being a matter for individual preference. But care should be taken in the selection of brood sows.

Too often the sow that resembles a rectangular box with four pegs for legs is selected as an ideal hog, and while this may be true if the purpose is slaughter, to produce young animals and give milk a rather tall, lengthy and deep-ribbed animal is to be preferred. The boar should be depended upon to give the square form and straight lines to the offspring, and no boar should be used unless pure-bred and of individual merit. Sows should not be bred under nine months old; a year is still better.

The boar should be older and somewhat larger than the sow, and should have plenty of exercise at all times and an abundance of nutritious food, especially during the breeding season.

Even with a small herd it is advisable to have more than one boar, as accidents are liable to happen, and a fine animal may prove to be impotent, thus causing serious loss.

It is also advisable to have pigs arrive as nearly as possible at the same time, and for this reason the breeding season should be as short as possible.

Breeding sows should be kept separate from stock hogs and the most careful attention given to their food. They should have abundant exercise, and dry, comfortable quarters in which to sleep.

A COSTLY BUT VALUABLE LESSON.

There is often trouble at farrowing time, the sows being unable to bring forth their young, and numerous devices are on the market for removing the pigs from the suffering mother; but prevention is, in this, as in many other ills, preferable to cure.

One spring I lost thirteen valuable young sows at farrowing time. I did some thinking then, I tell you. Finer pigs I had never seen than those I removed from the suffering sows; all large, fat and sleek. The thought occurred to me that perhaps these pigs were too large and too fat for the mother to give them birth.

The sows had been fed largely on corn, the best fat producer we have. But there is no need of fat in the new-born pig. What is desired is a spare frame, with bone and muscle predominating.

After that experience, corn was fed sparingly to sows after breeding. Oats, shorts, bran, middlings, with roots when they could be procured and some clover hay occasionally, was the invariable ration. A very small amount of corn was supplied, with the result that I never again used an instrument at farrowing time, or lost a sow at that critical period.

The hog house I have described is ideal for sows at farrowing time. The building should be clean and the floor covered to a depth of three or four inches with dry, bright straw. The gates of the pen being open and

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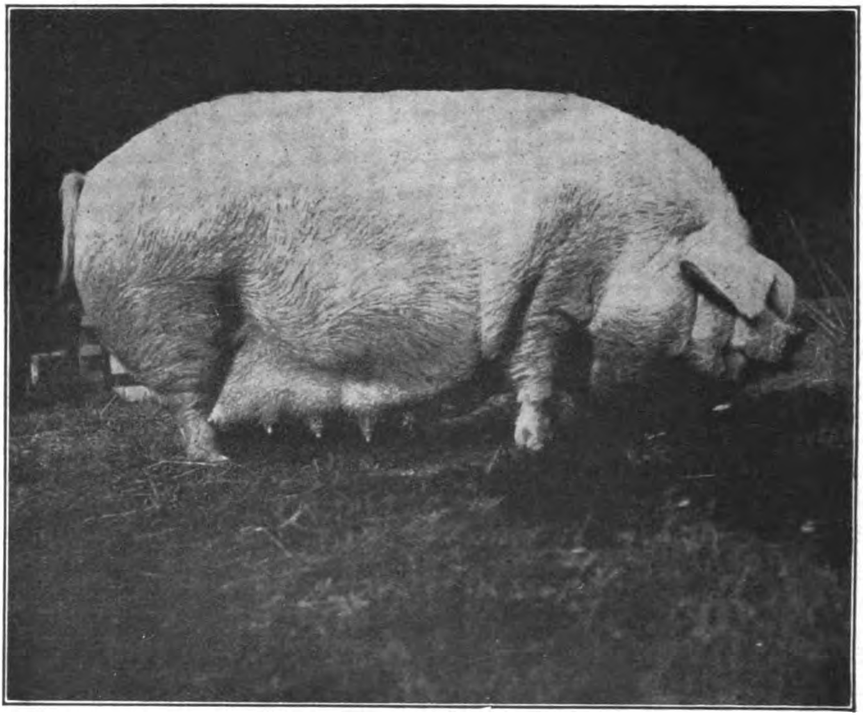
the sow feeling the approach of maternity, she selects her pen and proceeds to gather straw in her mouth and make for herself a comfortable bed. Now, instead of chasing and running after the prospective mother to get her in a pen, pass in quietly, and when the sow is making her bed gently close the gate. Go into the pen, speak kindly to the sow, scratch her back and sides and get on good terms with her. Let her know that you are a true friend.



A Chester White sow in show condition.

This matter of making friends with your brood sows before time of farrowing is of utmost importance. If the litter is the sow's first one, or the sows have been purchased and are strange to the place, they should be made to feel perfectly at home and acquainted with the attendant who shall have charge of them at farrowing time, at least a week before the sows farrow. The sow that feels acquainted and friendly with her attendant will allow fresh bedding to be supplied and the cleaning of the pen or other necessary attention without becoming excited.

If you have been kind at all times and on good terms with your hogs, this will be an easy matter; and unless you have love and a kindly disposition and affection toward domestic animals you should not engage in the swine business.

At farrowing time make it a rule to visit the hog house the last thing before retiring for the night and the first thing in the morning. And do

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not hesitate to get up in the night to see that all is well, for often the life of a valuable pig may be saved. A fender on three sides of the pen will prevent the mother overlaying her pigs, which often happens with old and heavy sows.

After the sow has farrowed, remove the wet bedding, giving a limited supply of dry, clean straw or other good material. There is danger in too much bedding, and care must be taken to prevent smothering the young pigs.

A drink for the sow is imperative after her labor, but it should be warm. Under no circumstances should she be given cold water at this time. Solid food should not be given the sow for at least twenty-four hours after farrowing. A thin warm swill, consisting of a small quantity of ground oats, bran, shorts or other mill feed, may be added to the water.

A useful combination barrel-and-box cart.

STRICT ATTENTION TO FEEDING BROOD SOWS.

Care must be taken not to overfeed the sow at this time and thus cause fever in the pigs by too great a flow of milk, which the young are unable to assimilate.

At one time I had over two hundred pigs, one of the finest lots I ever saw, there being only about two weeks difference in age between the oldest and youngest. Determined to outdo all my former efforts, I procured a large quantity of oil meal, shorts, ground corn and oats, and how I did feed those sows. At the end of three weeks I had just one pig left. After this experience, I lay awake many a night, thinking.

I had learned another lesson and paid dearly for the experience, but knowledge secured without price is not appreciated as well as when it is costly. By overfeeding the sows I had caused an abnormal flow of milk, far beyond the capacity of the young pigs to assimilate; high fever resulted, and death quickly followed.

In the years that followed the sows were fed sparingly for some time, and corn meal and oil meal, with other heavy food, were not a part of the ration. As the pigs grow older and require more nourishment the food for the sow is gradually increased, but it is a good sign to see the mother gradually losing flesh during the time she is nursing her young.

A good deal, of course, depends upon the size of the litter, as a sow with eight or ten pigs to feed requires a larger amount of food than one with only three or four to nourish.

But while giving a sufficient amount of feed, care should be taken not to overfeed. When the pigs are a month old, and when the litter is a good-sized one, there is then no danger of overfeeding the sow.

When the pigs are a day or two old, the mother should be gently driven from the pen and forced to go to the pasture. I use the word driven, as at first the mother will positively refuse to leave the pigs. But with a little urging she can be induced to go. By feeding only outside it will require but a day or two until she will be eager to get out as soon as the gate is opened.

I prefer feeding on the floor outside, thus keeping the pen clean and dry, using it only for a bedroom.

The pigs should be kept in the pen until able to run around. The sow will go out forenoons and afternoons and return to the pen after being in the pasture an hour or two, but the pigs should not be allowed in the pasture when the grass is wet.

SEE THAT THE PIGS HAVE PLENTY OF EXERCISE.

After the pigs begin to get strong and are able to run and play it is highly important that they have room for sufficient exercise. When the weather is cold or stormy little pigs are apt to keep too closely in their nests and thus fail to get the exercise needed to develop strong heart action. If the sow is a heavy milker and the pigs are taking insufficient exercise they will become too fat and sluggish, and as a result "thumps" is likely to make inroads in these inactive litters to such an extent as to cause heavy losses. Little pigs after becoming a week or ten days old should be encouraged to take plenty of exercise every day out of doors, or in protected runways or yards where they can get fresh air and sunlight in abundance.

Individual hog houses scattered over the pasture serve a good purpose at this period; or a small enclosure for each sow and litter is always very desirable.

On the east side of the hog house there should be a feeding floor, and under no circumstances should hogs ever be fed on the ground and among filth. Cleanliness is imperative, and the feeding floor, whether of concrete or plank, should be cleaned after each meal.

There should be a tight fence around it to confine the hogs while eating, and at the same time to keep them off until the food for the meal is properly spread.

Troughs, V-shaped, a six- and an eight-inch plank being used, are convenient for feeding pigs, and can be readily placed on the feeding floor. Shelled corn soaked in water for not to exceed twelve hours is relished by pigs when old enough to eat. Corn meal does not make good swill, and ground oats with the shells is too coarse and wasteful.

An excellent swill is made from fine oatmeal obtained from oatmeal mills. This, combined with wheat shorts, will produce an excellent ration for growing pigs. Never allow swill to stand more than twelve hours, and in hot weather it is often well to feed it as soon as mixed, for a sour swill will cause scours and often proves fatal.

With a feeding floor and a gate that raises like a window sash, with a bolt to hold it the desired height, the smaller pigs can be given the advantage in feeding.

Have the movable troughs placed on the feeding floor. Fill them with the swill that has been prepared in an adjoining part separated by a partition from the feeding floor.

Raise the gate to the desired height to allow the smaller pigs to pass under, and it is surprising how soon they will learn to make their way among the larger hogs in order to get on the feeding floor.

After they have finished, replenish the trough with swill, raise the gate a notch for the next larger pigs, and so continue till at last the gate is raised high enough for the sows to enter and clean up what remains.

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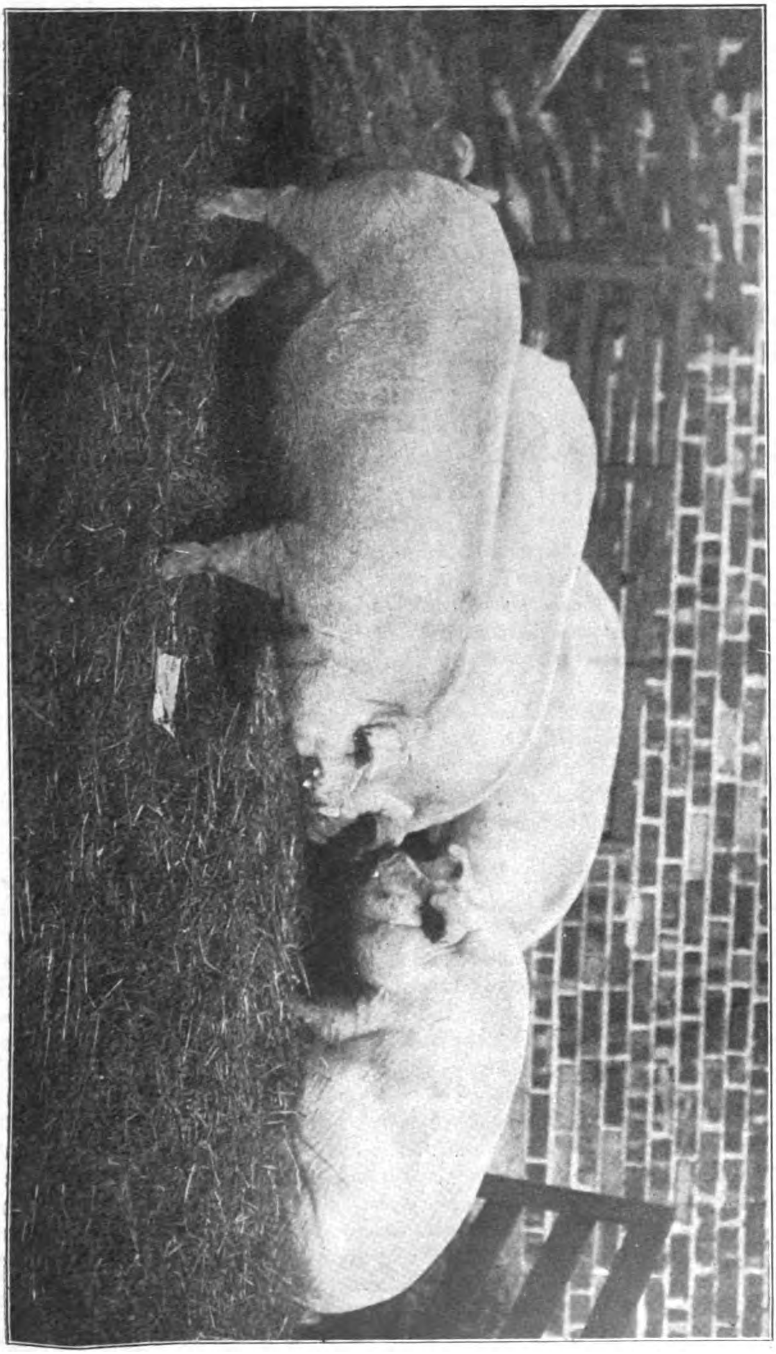

A group of modern Chester Whites.

By this method of feeding the smaller pigs get the best of the swill and more of it, and with this advantage uniformity in sizes is soon secured, a condition much to be desired.

While corn is the best fat producer, young growing pigs must have other food for making bone and muscle. Grass, shorts, ground barley, oatmeal and roots should be provided to give growth.

Pure water is indispensable at all times, but it should be furnished before feeding, never after.

A clean, dry bed; good, pure air; a clean feeding floor, and no more food than will be cleaned up by the pigs at every meal, combined with good judgment and a love for the work on the part of the stockman, will make the raising and fattening of hogs one of the most profitable industries of the farm.

GROWING HOGS IN NEBRASKA.

From Nebraska Experiment Station Bulletin No. 121, by W. P. SNYDER.

INTRODUCTION.

This bulletin gives the results of several years' work in growing hogs where alfalfa has formed an important part of the ration. During the summers the hogs have run in alfalfa pastures, and during the winters they have been fed alfalfa hay in various ways with grain.

Part I gives the cost of the average pig when it has reached the weight of 50 pounds and the cost of keeping brood sows.

Part II gives the cost of gains on the pig from the time it weighed 50 pounds until it was taken from the pasture to the fattening lot in the fall. At the end of this part a summary is given to indicate the cost of the fat hog when marketed.

The record of the pigs from the time they were taken from the pastures in the fall until they were marketed will appear soon as Bulletin No. 123.

In this bulletin the term "cost" includes only the cost of feed eaten and the ordinary risk; it does not cover the equipment, the labor or the interest on the investment.

The plan followed in determining the cost of the 50-pound pig was to keep a record of the cost of keeping the dam a year and of keeping the pig until it had reached the required weight, and to charge all this cost to the pig, after deducting the value of the increase in the weight of the sow during the year.

We have taken as the price of hogs the average price we have received for hogs at North Platte during the six years preceding 1911. This price was $5.90 per 100 pounds. We have taken the average price that we have paid for corn during the same time as the proper price for corn in this bulletin. This is 47 cents per bushel. The prices of the other kinds of feed are those which we consider to be the market prices prevailing here. It might be necessary to purchase the mill products in carload lots in order to deliver them at North Platte at these prices.

The prices used in calculating the results are as follows:

Hogs, per 100 pounds	$5 90
Corn, per bushel	47
Wheat, per bushel	70
Barley, per bushel	40
Rye, per bushel	56
Oil meal, per ton	30 00
Tankage, per ton	40 00
Alfalfa meal, per ton	15 00
Chopped alfalfa, per ton	10 00
Alfalfa hay, per ton	8 00

ALFALFA PASTURE. The cost of alfalfa pasture has not been included in the majority of the tables, but has been mentioned in the discussions in connection with the tables. The cost of pasture depends on the size of the hog and on the amount of grain being fed, as well as on many other conditions. We have figured it at 25 cents per month or .8 cent per day per hog not being fed grain, or one-half of that amount for hogs fed about a full grain ration. Pigs have been charged less.

Feed other than alfalfa is termed "grain" in the tables. Where chopped alfalfa or alfalfa meal was a part of any ration in the experiment, all the grain was ground. The alfalfa meal was mixed with the grain; the chopped alfalfa was put in the trough and the grain poured over it. The feed was moistened with water after being put in the trough. The feed was weighed for each lot separately for each feed, except where the sows were in separate pens at farrowing time and while the litters were young. At such times enough feed was weighed and mixed at one time to feed for several days.

The hogs had access to water at all times unless the weather was such that the water froze quickly. During such times water was supplied three times each day, or as often as there was any indication that the hogs cared for it. Water was supplied in the fields by means of a gravity water system that kept fresh water in cement troughs at all times.

In some of the tables the term "per cent" (%) is used in reference to the weight of the feed given daily in comparison with the weight of the hog. A 3% ration is 3 pounds of feed daily per 100 pounds weight of the hogs.

The "mean" weight is the average of the first and last weights in the period or the experiment.

PART I.

THE COST OF A FIFTY-POUND PIG, AND THE COST OF KEEPING BROOD SOWS.

It might be possible to arrive at conclusions regarding the cost of a 50-pound pig by isolating a sow and keeping a record on her and her litter. We have chosen, however, to keep the record on the entire herd or a large part of the herd, so that we may approach farm conditions as nearly as possible. In fact, all our experiments are conducted under farm conditions excepting that all feed is weighed and the hogs are weighed frequently.

The data on the cost of the pig cover three years. As our experience has become more extensive, we have been able to make the records more

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accurate and complete. This line of work is being continued, and further results will be published later. In the winter of 1910-'11, ten old sows were kept in good condition on a ration of less than 1 pound of corn daily, with a like amount of chopped alfalfa, per 100 pounds of the hogs. We are holding the results of this experiment until a later publication.

EXPERIMENT 12.

Record of six grade sows. Spring of 1908.

These sows had raised litters the previous spring. After the pigs were weaned, in July, 1907, the sows had no grain until winter set in, but ran on alfalfa pasture. From the first of winter until farrowing time they were fed alfalfa hay and corn. Until in January the corn fed amounted to only 1 per cent of the weight of the hogs daily, but during that month it was increased. They received approximately 1½ per cent of corn and all the alfalfa hay they wanted, and during the winter ran in a field that was sown to rye.

On April 25 the six sows weighed 1860 pounds and had 37 pigs which weighed 430 pounds. The sows averaged 310 pounds and the pigs 11.6 pounds. On June 20 the six sows weighed 1865 pounds and had 33 pigs which weighed 1500 pounds. The sows had maintained their weight and the pigs had gained 1070 pounds. The grain eaten from April 25 to June 20 by the sows and the pigs that ate with them was 1878 pounds, and by the pigs in the creeps 2012 pounds, a total of 3890 pounds, or 363 pounds of grain for 100 pounds of gain. The average daily gain per pig was .57 pound. The total amount of grain fed from January 27 till the pigs were weaned was 6695 pounds, or 446 pounds for each 100 pounds weight of pigs weaned. This statement does not include the cost of keeping the sow prior to January 27, 1908.

Record of twelve pure-bred sows. Spring of 1908.

These sows farrowed during March and the early part of April, 1908.

The weights of sows and pigs when put into the pasture were as follows:

April 25	6 sows,	2,150 lbs.;	42 pigs,	520 lbs.
May 9	4 sows,	1,485 lbs.;	35 pigs,	390 lbs.
May 23	2 sows,	740 lbs.;	17 pigs,	215 lbs.
Total	12 sows,	4,375 lbs.;	94 pigs,	1,125 lbs.
Average	12 sows,	365 lbs.;	94 pigs,	12 lbs.

On June 20 the 12 sows weighed 4105 pounds. They had lost during the time they were suckling their litters on pasture 270 pounds, or 12 pounds each. During this time they and the pigs which ate with them were fed 3988 pounds of grain.

On June 20 there were 93 pigs, one of the 94 having died. These 93 weighed 3280 pounds and had gained 2155 pounds, or 23 pounds per pig.

The total combined weight of sows and pigs put into the pasture was 5500 pounds and the combined weight when taken out was 7385 pounds, a gain of 1885 pounds. The total amount of grain eaten by sows and pigs was 7005 pounds, or 372 pounds for each 100 pounds of gain. If we consider only the gains made on the pigs without deducting from their gain the loss on their dams, 100 pounds gain was made with 325 pounds of

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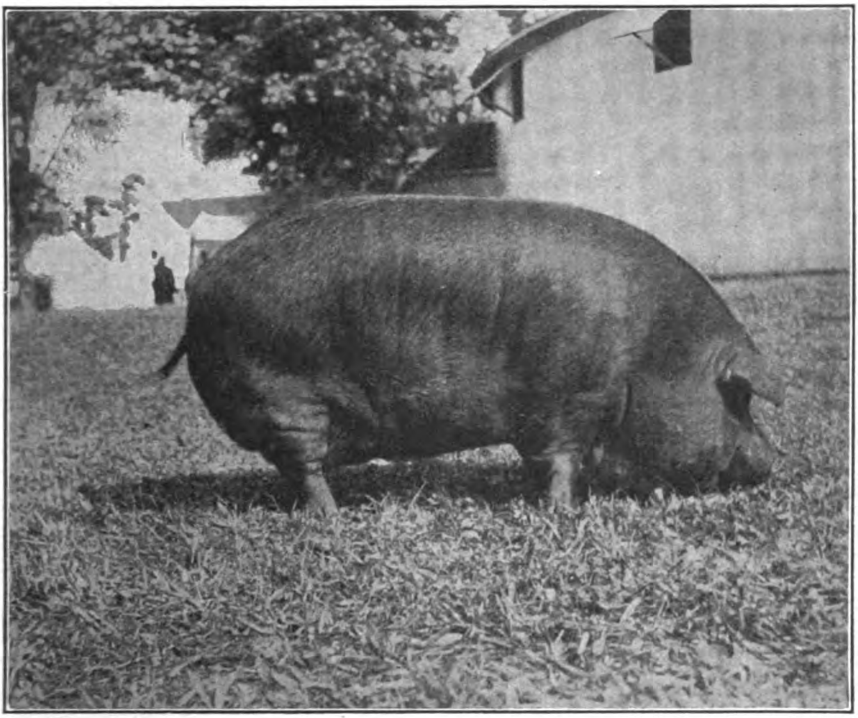

A Duroc-Jersey sow in show condition.

grain. This is not an unfair way to consider this, as the loss that the sows sustained would be regained on alfalfa without any grain and therefore at a small cost. The average gain per pig daily was .51 pound, or 2.1 per cent of the mean weight of the pig. This statement does not include the cost of keeping the sow before the time of farrowing.

EXPERIMENT 13.

Cost of producing a 50-pound pig, and cost of keeping brood sows. Record of 24 old sows (1908-'09).

During the winter of 1908 a record was kept of the grain fed to 24 old sows bred for spring litters. On November 7, when the sows were brought from the alfalfa pasture where they had been running without grain, they were put on a ration of alfalfa hay and 1½ pounds of corn daily per 100 pounds weight of the hogs. Their average weight at that date was 315 pounds. On December 5 the ration was reduced to 1 pound of corn daily per 100 pounds weight of the hogs. The corn was fed in the ear, but the figures given are for shelled corn. On February 27 the ration was again raised to 1.5 pounds daily per 100 pounds weight of the hogs. It required 10 bushels of corn with alfalfa hay, and about a bushel of mixed grain fed in the farrowing house, to run the average sow from the time she was taken from the alfalfa field until she farrowed. The cost of the grain was $5.19, and of the alfalfa probably $1.50; a total cost for feed of $6.69. An accurate record of the amount of alfalfa fed is not available. On January 30 the average weight of the sows was 379 pounds. The average weight of 21 sows that farrowed pigs was 427 pounds at the date of farrowing. This showed a gain during the winter of 112 pounds, at a cost of $6.69 for feed.

These sows did not make a favorable record at farrowing time. The average number of pigs farrowed was 9. This was low because one sow farrowed only 2 pigs and 3 others only 5 each.

The cost of grain per sow and litter from the date of farrowing until the pigs were weaned and had reached a weight of 50 pounds each was $11.89. There were 6 pigs per sow when this age was reached. The average weight per sow when the pigs were weaned was 371 pounds. This shows a gain of 56 pounds per sow above the weight on November 1. Three sows did not farrow. They are not taken into consideration in the statement below. If they had been sold at $5.90 per 100 pounds when the others farrowed, there would have been a slight profit from them. This would have lowered the cost of the 50-pound pig slightly. The following financial statement shows fairly accurately the cost of these pigs when they had reached the average weight of 50 pounds each. The charge of $1.50 for pasture is at the rate of 25 cents per month for the sow and for the litter when the pigs are with her. It is only an estimate. If this charge covers the cost of alfalfa for the entire time the sows are on pasture during the year, then the gain on the sows from November 1, 1908, to November 1, 1909, should be credited. This would be about 50 pounds or $2.90 more per sow. This would have reduced the cost of the pigs to $4.62 per 100 pounds. The record indicates that the cost of feed to produce a 50-pound pig in this test was $5.59 per 100 pounds, or $2.79 per pig.

FINANCIAL STATEMENT.

Cost of producing a 50-pound pig. Record of 24 old sows (1908-'09). Average per sow.

	Dr.	Cr.
To cost of grain November 1 till time pigs were farrowed, per sow	$5 19	
To cost of alfalfa hay during same time	1 50	
To cost of feed from farrowing time till pigs reach average weight of 50 pounds	11 89	
Pasture for sow 6 months and pigs while with sow	1 50	
By increase in weight of sow between November 1 and time pigs were weaned, 56 pounds, at $5.90	....	$3 30
By 6 pigs at 50 pounds each, 300 pounds, at $5.59	....	16 78
Cost of 50-pound pig, $2.79.	$20 08	$20 08

Cost of producing a 50-pound pig and the cost of growing young sows. Record of 25 gilts (1908-'09).

On August 1, 1908, 23 spring gilts were selected to be bred for spring litters. They ran in an alfalfa pasture and were fed a ration of one-half corn and one-half wheat until November 7. They were fed 2.52 pounds of grain daily per 100 pounds of their weight. We consider this a little more than a medium grain ration. The average daily gain was .87 pound. It required 333 pounds of grain for 100 pounds of gain. This increase

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in weight cost $3.34 per 100 pounds. This does not include the cost of the pasture. With hogs at $5.90 per hundred, these gilts paid 99 cents per bushel for the wheat and corn, considering 58 pounds of the mixture as being a bushel. The average weight of the gilts August 1 was 71.6 pounds, and November 7, 156.5 pounds. The results in detail are given in table 1.

TABLE 1. *Cost of growing young sows. Record of 25 gilts (1908-'09).*

LOT	36	36
DATE	Period 1. Aug. 1 to Nov. 7.	Period 2. Nov. 7 to Jan. 1.
Ration (alfalfa pasture, period 1)	50% corn, 50% wheat.	37½% corn, 37½% barley, 25% cut alfalfa.
No. pigs in lot	23	25
No. days in experiment	98	70
Av. first weight, lbs	71.6	152
Av. last weight, lbs	156.5	213.6
Av. gain, lbs	84.9	61.6
Av. daily gain, lbs	.876	.88
Grain for 100 lbs. gain, lbs	333	455
Alfalfa for 100 lbs. gain, lbs	Pasture.	153
Total feed for 100 lbs. gain, lbs	333	608
Cost of feed for 100 lbs. gain	$3.34*	$4 56
Profit on 100 lbs. gain	2.56	1.34
Profit per pig	2.17	.83
Profit per pig, daily	.022	.012
Grain fed daily per pig, lbs	2.88	4
Feed fed daily per pig, lbs	2.88	5.33
Grain fed daily per 100 lbs. weight of pig, lbs	2 56	2.18
Feed fed daily per 100 lbs. weight of pig, lbs	2.56	2.92
Av. mean weight per pig, lbs	114	182.8

* The cost of the alfalfa pasture is not included. At .4 cent per head daily the pasture would have cost 45 cents per 100 pounds gain, and this would have increased the cost of 100 pounds gain to $3.79.

On November 7, 2 gilts were added to this lot, making a total of 25. They were put into a 3-acre field that had been sowed to rye. This furnished only a small amount of green feed, but considerable exercise. The ration from this date until the gilts were taken to the farrowing houses was 3 parts grain and 1 part chopped alfalfa. The grain was 1 part corn and 1 part barley. The grain was ground, mixed with the alfalfa in the trough, and moistened with water. They ate of this mixture 5.33 pounds per head daily, or 3.90 pounds per 100 pounds weight of the gilts. They required 455 pounds of grain and 153 pounds of alfalfa for 100 pounds gain. The cost of grain and alfalfa for 100 pounds of gain was $4.56. The average daily gain per head was .88 pound. The average weight November 7 was 152 pounds, and on January 16, when the last weight was taken on the 25 gilts together, 213.6 pounds. The results of this feeding period from November 7 to January 16 are given in table 1.

The cost of grain per sow from August 1 to November 7 was $2.83; and from November 7 till she farrowed the cost of all feed was $8.03. The cost of grain from the date of farrowing until the average pig weighed 50 pounds was $10.18. There is added to these items $1.50 for pasture. This is an estimate which we feel is probably too high. This makes the total cost of feed for the sow from August 1, 1908, till the pigs were weaned and had reached the average weight of 50 pounds, about

July 1, 1909, $22.54. The charge for the alfalfa pasture is sufficient, probably, to carry the sows through till August 1, completing the year. During that month they would gain 15 pounds each. This would reduce the cost of the pigs below that given. Against the cost of $22.54, there was a gain of 168 pounds per sow when the pigs reached 50 pounds weight, over her weight on August 1, 1908, and 5.4 pigs per sow, weighing 50 pounds each, or a total of 270 pounds. The gain on the sow at $5.90 per 100 pounds would be $9.91, which reduces the cost charged against the pigs to $12.63. This leaves the pigs costing $4.68 per 100 pounds, or $2.34 each, when they weighed 50 pounds.

FINANCIAL STATEMENT.

Cost of producing a 50-pound pig and the cost of growing young sows. Record of 25 gilts (1908-'09). Average per sow.

	Dr.	Cr.
Average 23 young sows, grain August 1 to November 7..	$2 83	
Average 25 young sows, cost of feed November 7 to farrowing	8 03	
Cost of grain from farrowing until pigs weaned and at 50 pounds weight	10 18	
Pasture 6 months, at 25 cents per head per month......	1 50	
By gain in weight on sow, 168 pounds at $5.90	......	$9 91
By weight of 5.4 pigs at 50 pounds, 270 pounds at $4.68,	......	12 63
Cost of 50-pound pig, $2.34	$22 54	$22 54

EXPERIMENT 14.

Cost of producing a 50-pound pig and the cost of keeping brood sows. Record of 20 old sows (1909-'10).

After the pigs were weaned in the summer of 1909, the twenty sows ran in alfalfa pastures without any grain until they were taken off the alfalfa in the fall. During that time they made the usual gain for mature hogs running on alfalfa pasture without grain when in thin flesh—about .5 pound per head daily.

On October 29, 1909, 20 of these sows were selected to be bred for spring litters. The weight of the 20 was 6450 pounds, or 322.5 pounds each. They were put in a 5-acre field that had been sown to wheat. This furnished some green feed. The ration for the sows during the winter was alfalfa and ear corn. The plan was to feed 1 pound of corn (shelled) to 100 pounds weight of the hogs daily, weighing the sows every second Tuesday to determine the amount of feed for the next two weeks. During extremely cold weather the feed of corn was increased. The average mean weight per sow was 352.5 pounds and the average amount of corn eaten daily per hog was 3.75 pounds. This shows that the hogs received daily 1.06 pounds of corn (shelled) per 100 pounds of their weight, or a very slight increase over 1 per cent. The last weight taken before farrowing was on February 15. The 20 sows on this date weighed 7650 pounds, or 382.5 pounds per head. This shows a gain of 60 pounds each during the winter, or a gain of .55 pound each daily. There was fed, in addition to the corn, 6 tons of alfalfa hay, valued at $8 per ton. The hay fed per hog was .3 ton (600 pounds). The hogs picked off the leaves and finer stems and the remainder was given to the cattle. The

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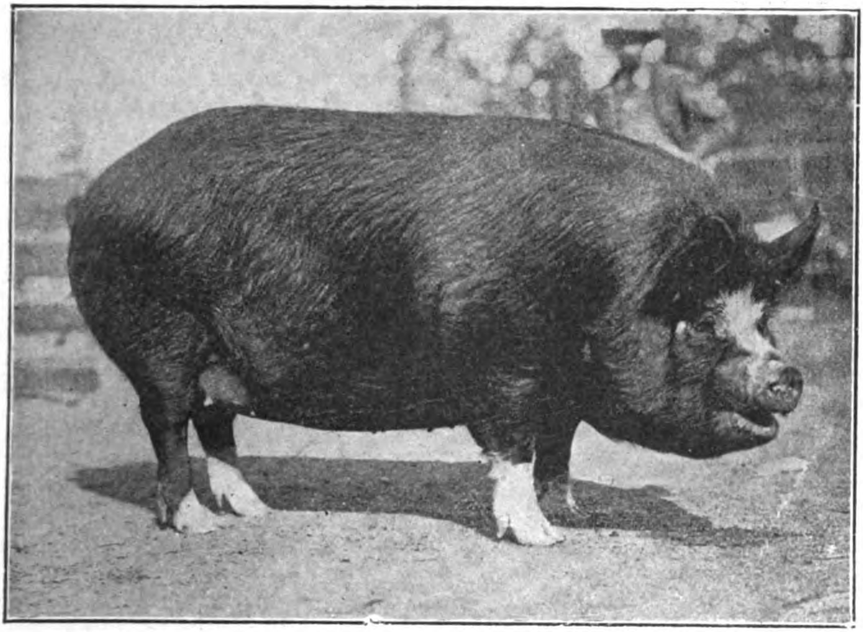
hogs probably got two-thirds of the total value out of the alfalfa or .2 ton (400 pounds) each.

At $8 per ton .2 of a ton would cost $1.60 for alfalfa hay eaten between October 29 and February 15. During the same time, on the average, each sow ate 7.32 bushels of corn. This at 47 cents per bushel cost $3.44. The cost of the alfalfa and grain to keep a sow in this experiment from October 29 to February 15 and to produce 60 pounds weight increase was $5.04.



A Berkshire gilt in show condition.

The sows were taken from the field to the farrowing house as the time of farrowing approached. After they were put into the house they were fed a mixed grain ration containing 50 per cent corn, 20 per cent wheat, 20 per cent emmer, and 10 per cent alfalfa meal.

The cost of feed per sow from February 15 until each sow farrowed was $1.09 per sow. The average weight per sow at farrowing date was 433 pounds. There was a gain of 111.5 pounds per head between October 29 and the date of farrowing. The cost of feed per sow during that time was $6.13. If we add 25 cents per month for 4 months as the cost of summer pasture after the 1909 litter was weaned, the cost of keeping a sow from the time of weaning one spring litter until she was ready to farrow another spring litter and to put her into a good condition of flesh was $7.13. As these sows raised more than an average of 7 pigs, in this case the item of cost would be about one dollar per pig raised.

One of the 20 sows was not in pig. The others farrowed from March

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3 to April 7, the average farrowing date being March 17. There is a farrowing record on 18 sows. The average weight before farrowing was 427.5 pounds and after farrowing 392.5 pounds. These weights were taken within two days of the date of farrowing.

The average number of pigs in a litter was 10.7 and the average weight per pig when farrowed was 2.24 pounds. The average loss in weight per sow at farrowing time was 35 pounds. The average weight of litter of pigs was 24 pounds. This left a net loss of 11 pounds per sow at farrowing time.

The record after the date of farrowing is very unsatisfactory. On March 26 the prairie fire which swept over a large area between the South Platte river and the Burlington railroad burned one farrowing house and four sows with their litters and the litter of another sow. This fifth sow was burned badly, but recovered and was sold on the market. A sixth sow died when her litter was about four weeks old. The pigs went to other sows, and some of them lived, but where one lived it probably crowded out a weaker pig, so that this litter was almost a total loss. This left 13 sows with litters.

While in the farrowing house after farrowing, the sows were fed a mixture of 50 per cent corn, 40 per cent wheat and 10 per cent alfalfa meal for a time, but later the alfalfa meal was replaced by oil meal. The cost of feed for the sows during this time was $1.17 per head.

Five sows with 35 pigs were put on pasture March 29; 6 sows with 42 pigs were turned in April 5; and 2 sows with 18 pigs were turned in April 13, a total of 13 sows and 95 pigs. This was an average of 7 pigs per sow. While on pasture the sows and pigs were fed a ration of 50 per cent corn, 45 per cent wheat, and 5 per cent oil meal, and the pigs were fed soaked corn in "creeps." The cost of the feed per sow and litter on pasture until 95 pigs had reached the average weight of 50 pounds was $9.19. Owing to the loss of so many sows, it is difficult to determine the exact cost of raising these pigs. Yet, by using the average cost per sow, we can arrive at quite accurate results.

The average weight of these 13 sows when their litters were weaned in 1909 was 288 pounds, and in 1910 when the pigs were weaned was 383 pounds. This shows an increase in weight of 95 pounds per sow during the year. The cost of feed per sow from October 29 till the time of farrowing was $6.13 per sow; and from farrowing time until the average weight of the litters was 50 pounds per pig, the cost per sow and litter was $10.36. We should add to this the cost of pasture, which was $1.50 from the time the 1909 litter was weaned until the 1910 litter was weaned. The total cost of keeping a sow one year and rearing 7.3 pigs to the average weight of 50 pounds was, in this experiment, $17.99. There was a gain of 95 pounds on each sow, which, at $5.90 per 100 pounds, was worth $5.60. This leaves $12.38 as the cost of 7.3 pigs weighing 50 pounds each. This shows that the cost of these pigs was at the rate of $3.39 per 100 pounds, or $1.70 for a 50-pound pig.

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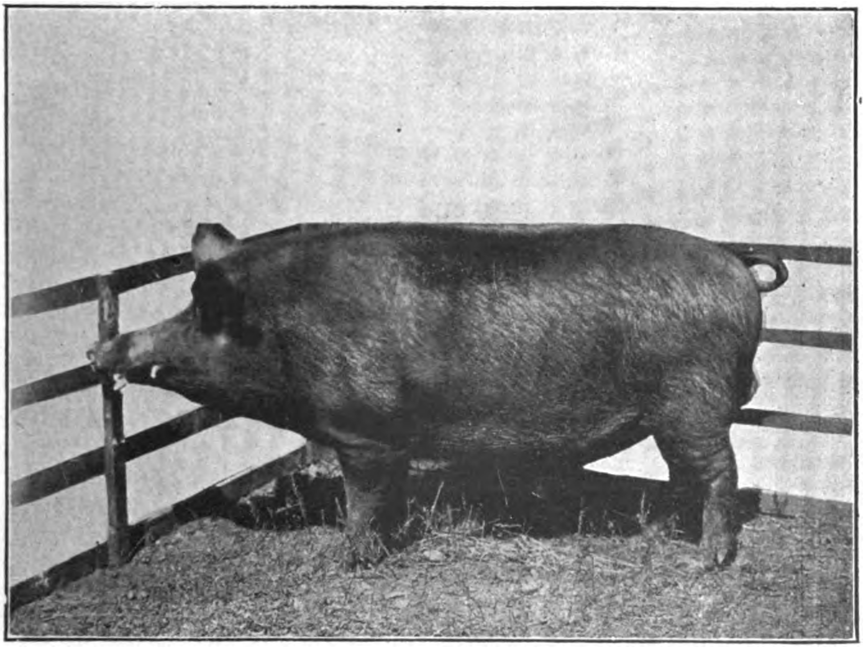
FINANCIAL STATEMENT.

Record of cost of keeping old sows and the cost of pigs of 50 pounds weight. Average of 20 sows during winter and 13 sows and litters in spring and summer.

	Dr.	Cr.
July 1, 1909, 1 sow, weight 288 pounds, at $5.90......	$16 99	
1213.4 pounds corn, at 47 cents per bushel...........	10 19	
342.4 pounds wheat, at 70 cents per bushel...........	3 99	
10.4 pounds emmer, at 35 cents per bushel...........	09	
33.5 pounds oil meal, at $30 per ton.................	50	
15.2 pounds alfalfa meal, at $15 per ton.............	12	
.2 ton alfalfa hay, at $8 per ton....................	1 60	
Alfalfa pasture, sow and litter......................	1 50	
July 1, 1910, 1 sow 383 pounds, at $5.90.............	......	$22 60
7.3 pigs, 50 pounds each—365 pounds, at $3.39.......	......	12 38
Average cost of a 50-pound pig, $1.70................	$34 98	$34 98

Cost of producing a 50-pound pig and the cost of growing young sows. Record of 25 gilts (1909-'10).

On August 3, 1909, 25 gilts that were farrowed in March and April of that year were selected for the young breeding herd of the succeeding year. The average weight of the gilts on this date was 76.8 pounds. They ran in an alfalfa pasture until November 9, and were fed a medium grain ration. The grain consisted of 3 parts shelled corn and 1 part ground wheat, both soaked together 12 hours.



A Tamworth boar.

These 25 gilts while on alfalfa pasture from August 3 to November 9, 14 weeks, were fed 2.68 pounds of grain daily per 100 pounds of weight. The average mean weight was 116 pounds. On the average these hogs ate 3.12 pounds of grain daily.

There were required for 100 pounds gain, 390 pounds of the grain mixture. The gilts gained at the rate of .8 of a pound daily. The cost of the grain for 100 pounds gain was $3.59, counting corn at 47 cents per bushel and wheat at 70 cents per bushel. With hogs worth $5.90 per 100 pounds, there was a margin of $2.31 over the cost of the grain on each 100 pounds of pork produced. If the cost of the alfalfa pasture was included, this margin would be reduced slightly.

On November 9 the gilts were put into a 3-acre field that had been sown to rye. Owing to dry weather the rye made but little growth. However, it gave the hogs something to work at and thus furnished exercise.

From this date until the gilts were placed in the farrowing house, which was from March 26 to May 4, the ration consisted of 3 parts grain to 1 part chopped alfalfa. The grain was half corn and half barley until January 11, when the barley was replaced by wheat. The exact proportions of the different grains and the alfalfa were as follows:

Grain ration,	corn	51.1 per cent.
	barley	21.4 per cent.
	wheat	27.5 per cent.
		100.0 per cent.
Total ration,	grain	75.7 per cent.
	alfalfa	24.3 per cent.
		100.0 per cent.

The feed, including the alfalfa, amounted to 3 pounds daily per 100 pounds weight of the gilts until November 30. The sows were becoming too fat. The ration was reduced to 2.75 per cent until March 1, when it was reduced to 2.25 per cent, and on March 15 to 2 per cent. This was done in order that the sows should not become too fat. Even with this light feed, many hog men might have considered these sows in too high condition at farrowing time. The average weight of these gilts March 15, when they were less than a year old, was 276 pounds. The average weight of these sows at the date of farrowing was 320 pounds. It has been our experience that where sows have plenty of exercise and alfalfa and not over one-half corn in the grain ration, they may carry a considerable amount of flesh and still farrow and care for large litters. The flesh is a help if put on with the proper feed and under proper conditions.

During the 18 weeks, November 9, 1909, to March 15, 1910, the gilts gained .95 pound each per day on 4.12 pounds of grain and 1.32 pounds of alfalfa, or a total of 5.44 pounds of feed daily. On the average, the grain fed amounted to 1.9 pounds per 100 pounds of the hogs daily; the total feed per 100 pounds weight of the hogs was 2.52 pounds daily. There were required for each 100 pounds of gain, 430 pounds of grain and 138 pounds of alfalfa—a total of 568 pounds. Using the prices

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assumed in this bulletin, these gilts gave a profit of $1.60 per 100 pounds gain above the cost of feed, or a profit of 1.5 cents each per day. The performance of these gilts during the winter period was quite satisfactory. The gain was made with sufficient rapidity to give satisfactory weights at farrowing time; the feed was of such nature as to produce growth rather than excessive fat; and the ration was economical.

While still in the field, after March 15 and before being put in the farrowing house, the gilts ate, on the average, 139 pounds of grain and 35 pounds of alfalfa. At farrowing time and after farrowing the gilts did not do as well as is usually expected. One proved to be not in pig. One litter was dead when farrowed, and another died within 48 hours after being farrowed. The dam of this latter litter died a few days later. Two other gilts died when the pigs were less than two weeks old. This left only 20 sows with their litters. We do not know the cause of this loss. There was evidently some disease present. The 24 sows farrowed 193 pigs, an average of 8 pigs each.

While in the farrowing house before farrowing, these 24 gilts ate a mixed ration of grains and alfalfa. The amount of this eaten by each sow was 28 pounds. The average weight of the sows before farrowing was 320 pounds, and after farrowing 290 pounds. There was a loss of 30 pounds per sow at farrowing time. The average weight of the litters was 18.6 pounds. Therefore the actual loss per sow was 11.4 pounds. The average weight per pig was 2.3 pounds. Between the times of farrowing and being turned on alfalfa the sows ate, on the average, 53 pounds of grain. There were 20 sows and 133 pigs turned on alfalfa pasture. This was an average of 6.6 pigs per sow. On May 31 the 20 sows weighed on the average 277 pounds, and the 133 pigs averaged 16 pounds each.

The pigs were taken away from the sows when each lot reached the weight of 50 pounds per pig. Two lots containing 56 pigs reached this weight July 7, one lot of 30 on July 26, and a lot of 44 on August 9. There were 130 pigs when the 50-pound weight was taken. On these dates the average weight of the sows was 281 pounds. This was a loss of 9 pounds per sow while suckling the pigs. The loss on the sows was 180 pounds and the gain on the pigs after birth 6175 pounds, or a net gain on sows and pigs of nearly 6000 pounds. The amount of feed eaten from the date of farrowing until the 50-pound weight was taken was 14,036 pounds corn, 5850 pounds wheat and 480 pounds oil meal. This shows that 339.4 pounds of feed was required to produce 100 pounds of gain on these pigs after deducting the loss of weight of the sows from the increase in weight of the pigs. The alfalfa pasture was in addition to this. The cost of the grain and oil meal for 100 pounds gain was $3.24.

The following statement, summarizing the preceding discussion, indicates that the cost per 100 pounds of the pigs, when averaging 50 pounds each, was $3.89. This is considering the sows worth the same per 100 pounds when 5 months old as when 17 months old. Whether a fleshy pig weighing 75 pounds or a sow thin in flesh and weighing 275 pounds is worth more per 100 pounds on August 1 is an open question.

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FINANCIAL STATEMENT.

Record of 25 gilts (1909-'10) showing the cost of producing a 50-pound pig and the cost of growing young sows.

	Dr.	Cr.
August 3, 1909, 25 sows, 1920 pounds, at $5.90	$113 28	
August 3, 1909, 509 bushels corn, at 47 cents	239 23	
July 20, 1910, 221 bushels wheat, at 70 cents	154 70	
61.5 bushels barley, at 40 cents	24 60	
480 pounds oil meal, at $30 per ton	7 20	
5061 pounds chopped alfalfa, at $10 per ton	25 30	
25 sows pasture, at $1.50 per head	37 50	
July 20,* 1910, 3 sows died.		
22 sows, 6182 pounds, at $5.90	......	$364 74
130 pigs, 6500 pounds, at $3.89	......	253 32
Cost of a 50-pound pig, $1.95.	$618 06	$618 06

* Approximate date.

TABLE 2. *Cost of growing young sows. Record of 25 gilts (1909-'10).*

LOT	37	37
DATE	Period 1, Aug. 3 to Nov. 9.	Period 2, Nov. 9 to March 15.
Ration (alfalfa pasture, period 1)	75% corn. 25% wheat.	37½% corn. 27½% barley. 25% chopped alfalfa.
No. days in experiment	98	126
Av. first weight, lbs.	76.8	155.6
Av. last weight, lbs.	155.6	276.4
Av. gain, lbs	78.8	120.8
Av. daily gain, lbs.	.8	.95
Grain for 100 lbs. gain, lbs	390.	430.
Alfalfa for 100 lbs. gain, lbs.	....	138.
Total feed for 100 lbs. gain, lbs.	390.	568.
Cost of feed for 100 lbs. gain	$3.58*	$4.30
Profit on 100 lbs. gain	2.31	1.60
Profit per pig	1.82	1.92
Profit per pig daily	.018	.015
Grain fed daily per pig, lbs.	3.12	4.09
Feed fed daily per pig, lbs.	3.12	5.40
Grain fed daily per 100 lbs. weight of pig, lbs.	2.68	1.9
Feed fed daily per 100 lbs. weight of pig, lbs.	2.68	2.52
Av. mean weight per pig, lbs.	116.2	216.0

* Cost of alfalfa pasture is not included. If we charge these pigs .4 cent each per day for pasture, the cost of the pasture per 100 pounds gain would be 49 cents. This would raise the cost of 100 pounds of gain to $4.07.

TABLE 3. *Cost of a 50-pound pig.*

	1908-'09.		1909-'10.	
Number of old sows	24	....	20	....
Number of gilts	......	25	......	25
Weight after weaning, lbs	265	Aug. 1 71	272	77
Gain on pasture, Aug. 1 to Nov. 10, lbs	50	85	50	79
*Weight Nov. 10, lbs	315	156	322	156
Weight at farrowing, lbs	427	298	433	320
Gain during winter, lbs	112	142	111	164
Weight at weaning time, lbs	371	239	383	281
Loss while suckling, lbs	56	59	50	39
Gain for one year, during experiment	106	168	111	204
① Grain eaten before farrowing, bu	11	20.15	9 62	18.61
① Grain eaten by sow and litter after farrowing, bu	25.28	21.66	22.04	19.05
Cost of summer pasture	$1.50	$1 50	$1.50	$1.50
Cost of winter grain	②5.19	③9.55	②4.52	③8.74
Cost of winter alfalfa	1.50	1.31	1.60	99
Cost of grain after farrowing, for sow and litter until pigs averaged 50 lbs. each	11.89	10.18	10.36	8 96
Cost of feed for sow and litter for one year	20.08	22.54	17.98	20.19
Number of pigs farrowed, per sow	9	8	10.7	8
Number of pigs weaned, per sow	6	5.4	7	6.5
Cost of a 50-pound pig	$2.79	$2.34	$1.70	$1.95
Cost of grain per sow, Aug. 1 to Nov. 7	......	2.83	......	2.72

*** Approximate date.**
1. Corn or the equivalent of corn in cost.
2. November 10 to farrowing date.
3. August 1 to farrowing date.

EXPERIMENT 15.

Record of seven sows with fall litters, showing the cost of a 50-pound pig.

In the fall of 1910, from September 10 to 15, seven sows farrowed. The weather was extremely hot when the majority of these sows farrowed, and as a result a very small number of pigs were saved.

These sows had raised spring litters that were weaned about May 20, or four months before the fall litters came. During these four months they ran on alfalfa pasture without grain, until about to farrow the fall litters. They were then given a total of 250 pounds for the seven head. The cost of this grain was $2.09. At 25 cents per month per head, the cost of the alfalfa pasture between the weaning of the spring litter and the farrowing of the fall litter would be $1 per head. We do not have the weight of these sows May 20, and therefore consider that their increase in weight from May 20 to September 10 paid for only the 250 pounds of grain and the pasture. There was, probably, considerable profit during this time, as this charge for pasture is at the rate of about .8 cent per head daily, and under these conditions a sow usually gains .5 pound daily, or a daily gain worth 2.9 cents.

Since we do not have the weight on May 20 we begin with the weight immediately after farrowing. The following statement shows that if we charge these sows with their weight immediately after farrowing at $5.90, and with the weight of their pigs at that time at $5.90, and also charge them with all the feed eaten, and credit them with their weight when their pigs are weaned at $5.90, we have to credit the weight of their pigs at only $3.76 per hundred when they have reached the 50-pound average in order to balance the account. The 23 pigs that died are charged against the sows. This record shows that when all items of feed and loss are included, the cost of the 50-pound pig in this test was $1.88, or at the rate of $3.76 per 100 pounds.

The average results of the five preceding lots of hogs indicate that the cost of the 50-pound pig was $2.13, or at the rate of $4.26 per 100 pounds. This does not include cost of labor, or equipment, or interest on investment.

FINANCIAL STATEMENT.

Record of seven sows raising fall litters in 1910, and showing the cost of a 50-pound pig.

	Dr.	Cr.
September 10—7 sows, 2975 pounds, at $5.90	$175 52	
57 pigs, 117 pounds, at $5.90	6 90	
32.6 bushels corn, at 47 cents	15 32	
30.11 bushels wheat, at 70 cents	21 80	
28.6 bushels barley, at 40 cents	11 44	
September 10 - November 10—2 months' pasture at 25 cents per month per head	3 50	
December 9—7 sows, 2945 pounds, at $5.90	....	$173 75
34 pigs, 1615 pounds, at $3.76	....	60 73
Cost of a 50-pound pig, $1.88.	$234 48	$234 48

PART II.

THE COST OF GROWING PIGS ON ALFALFA PASTURE AND GRAIN.

EXPERIMENT 16.

Record of pigs during summer or 1904 and 1906.

Experiments were conducted in which spring pigs were grown on light, medium, and full rations of grain and alfalfa pasture. The following table, No. 4, is taken from page 16 of Bulletin No. 99. The item of cost is corrected to agree with the prices used in this bulletin.

According to this table the daily gain per pig varied from .28 pound to 1.08 pounds, depending principally on the amount of grain fed. The cost of the grain for 100 pounds of gain was from $1.02 to $2.82. It is difficult to estimate the cost of the alfalfa pasture eaten by each lot. Those which were fed a light ration did not eat as much as those fed a heavier ration. It may be fair to charge .6 cent per head daily where a .5 per cent ration of grain was fed, .5 cent daily where a 1 per cent ration of grain was fed, .4 cent daily where a 2 per cent ration of grain was fed, and .3 cent daily where a full feed was given. When this charge is made, the cheapest gain is not always the gain made largely from alfalfa pasture.

The total cost of 100 pounds of gain on these pigs, when the cost of the alfalfa is calculated as given above, varies from $2.10 to $3.52. The average of the cost of gains on all these lots is $2.80. If the price charged for alfalfa is approximately correct, these data would indicate that there is more profit from feeding a medium or full grain ration than from feeding a light grain ration. The cost of gains is about the same, but the hogs fed the most grain made the fastest gains.

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TABLE 4. *Summary of results of growing pigs on alfalfa pasture and grain (1904 and 1906).*

Lot	1	22	2	4	23	25	26	3	24	27
Experiment began	July 16, 1904.	July 23, 1906.	July 16, 1904.	Aug. 20, 1904.	July 23, 1906.	July 28, 1906.	July 28, 1906.	July 16, 1906.	June 23, 1906.	July 28, 1906.
Ration	Corn 5%	Corn 1%	Corn 1.5%	Corn 2%	Corn 2%	Corn 2%	Grain 2% ¾ corn ¼ shorts	Corn 2.5%	Corn 3 to 4%	Grain 3 to 4% ¾ corn ¼ shorts
Number pigs in lot	17	30	17	12	30	30	30	17	30	30
Number of days in experiment	98	119	98	63	119	84	84	98	119	84
Average last weight, lbs	79	101	88	74	120	92	82	100	171	108
Average first weight, lbs	52	42	52	43	42	39	38	52	42	38
Average gain, lbs	27	57	36	31	75	53	44	48	125	70
Average gain daily, lbs	0.28	0.5	0.37	0.47	0.65	0.63	0.53	0.51	1.08	0.84
Average profit daily, cents	0.018	0.022	0.015	0.019	0.026	0.028	0.023	0.017	0.036	0.03
Grain per 100 lbs. gain, lbs	121	132	222	211	220	173	196	322	336	273
Price of alfalfa pasture per pig daily	$0.006	$0.005	$0.005	$0.004	$0.004	$0.004	$0.004	$0.004	$0.003	$0.003
Cost of pasture for 100 lbs. gain	2.18	1.05	1.36	0.81	0.63	0.65	0.76	0.82	0.28	0.36
Total cost of 100 lbs. gain	3.20	2.16	3.22	2.58	2.48	2.10	2.68	3.52	3.10	2.99
Profit per pig daily	0.007	0.018	0.01	0.016	0.021	0.024	0.017	0.012	0.03	0.024

EXPERIMENT 17.

Record of pigs during summer of 1908.

We have accurate records on 5 lots, a total of 169 pigs, during the summer of 1908. Two lots of 43 pigs each were fed 63 days. Two lots of 30 each were fed 112 days, and 1 lot of 23 were fed 98 days. The rations varied, as well as the amount of grain fed. The record on these is given in table 5. Lots 38 and 39, 40 and 41 are discussed more fully in Bulletin 123. These pigs weighed from 57 pounds to 71 pounds when this record began. They gained from .62 pound to .96 pound per head daily, or an average of .8 pound daily. They required 308 pounds of grain for 100 pounds gain. The cost of grain for 100 pounds gain was $2.80. The mean weight of these pigs was 100 pounds. They were fed 2.51 pounds of grain per head daily, or 2.44 pounds grain daily per 100 pounds weight of the hogs. The average weight of 169 pigs when taken from the pasture in the fall was 138 lbs. It is probably fair to charge lots 38 and 39, which were on a medium grain ration, .4 cent per head daily for pasture, and lots 40 and 41, and 36, which were on about a full grain ration, .3 cent per head daily. When making this charge we find that the average cost of 100 pounds gain on the five lots was $3.25.

TABLE 5. *Cost of gains on grain and alfalfa pasture. Record of pigs during summer of 1908.*

LOT	38	39	40	41	36
DATE	Aug. 22 to Oct. 24.		July 18 to Nov. 7.		Aug. 1 to Nov. 7.
Ration (alfalfa pasture)	Corn Barley	Corn Barley	Corn	Corn Wheat	Corn Wheat
Number pigs in lot	43	43	30	30	23
Number days in experiment	63	63	112	112	98
Average first weight, lbs.	57	57	64.6	64	71.6
Average last weight, lbs.	96	97	166	172.6	156.5
Average gain, lbs.	39	40	101.4	108.6	84.9
Average daily gain, lbs.	0.62	0.63	0.90	0.96	0.88
Grain for 100 lbs. gain, lbs.	252	245	366	343	333
Cost of grain for 100 lbs. gain	$2.11	$2.07	$3.07	$3.43	$3.34
Profit on 100 lbs. gain	3.79	3.83	2.83	2.47	2.56
Profit per pig.	1.48	1.53	2.87	2.68	2.17
Profit per pig daily	0.023	0.024	0.026	0.024	0.022
Grain fed daily per pig, lbs.	1.56	1.54	3.29	3.28	2.88
Grain fed daily per 100 lbs. weight of pig	2.04	2.0	2.86	2.77	2.52
Average mean weight per pig	76.5	77.0	115.3	118.3	114.0

Charging the following price for alfalfa pasture, the cost is as follows:

Cost of alfalfa pasture per pig daily	**$0.004**	**$0.004**	**$0.003**	**$0.003**	**$0.003**
Cost of alfalfa pasture for 100 lbs. gain	**0.64**	**0.63**	**0.33**	**0.31**	**0.35**
Total cost of 100 lbs. gain	**2.75**	**2.70**	**3.40**	**3.74**	**3.69**

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EXPERIMENT 18.

Record of pigs during the summer of 1909.

For the summer of 1909, we have the record of 6 lots of pigs. There were 198 pigs in the 6 lots.

The following table shows the rations fed and gives the results of the tests. The pigs ran in alfalfa pastures. The grain ration varied from nearly a full ration to a medium ration. The size of the pigs in the several lots varied. An average of the 6 lots should give approximately the results that would be obtained by the farmer from his pigs during the summer, where he gave them good care and allowed them to run on alfalfa pasture. In some of these lots the cost of gains is higher than usual. On the whole, the cost of gains during the summer of 1909 is higher than the average.

The average weight of the pigs when these records began was 65.4 pounds, and when the tests closed 120.9 pounds, per pig. The average daily gain per pig was .67 pound. The grain fed daily per 100 pounds weight of the pigs was about 2.68 pounds, or the amount of grain fed per pig daily about 2.59 pounds. There were required 370 pounds of grain for 100 pounds of gain. The cost of the grain for 100 pounds of gain was $3.25. If we charge the pigs .3 cent each per day for alfalfa pasture, we find that the cost of pasture for 100 pounds of gain varied from 35 cents to 73 cents, depending largely on the amount of grain fed. This cost for pasture raises the total average cost of 100 pounds gain to $3.73.

TABLE 6. *Cost of gains on grain and alfalfa pasture. Record of pigs during the summer of 1909.*

LOT NO.	37	42	43	43A	43B*	43C
DATE	Aug. 3. Nov. 9.	Aug. 31. Nov. 9.	Aug. 31. Nov. 9.	July 27. Nov. 1.	Aug. 17. Nov. 1.	Aug. 17. Nov. 1.
Ration (alfalfa pasture)	75% corn 25% wheat	Corn	50% corn 50% barley	75% corn 25% rye and wheat	75% corn 25% rye and wheat	75% corn 25% rye and wheat
Number pigs in lot	25	30	30	38	36	39
Number days in experiment	98	70	70	97	86	86
Average first weight, lbs	76.8	86.1	86.4	44.5	36.8	61.7
Average last weight, lbs	155.6	146	142.7	101	83.8	96 7
Average gain, lbs	78.8	59.9	56.3	56.5	47	35.0
Average daily gain, lbs.	0.8	0.85	0.80	0.58	0.54	0.46
Grain for 100 lbs. gain, lbs	390	433	514	275	260	349
Cost of grain for 100 lbs. gain	$3.58	$3.64	$4.29	$2.48	$2.35	$3.15
Profit on 100 lbs. gain	2.31	2.26	1.61	3.42	3.55	2.75
Profit per pig	1.92	1.35	0.91	1.93	1.67	0.96
Profit per pig daily	0.02	0.018	0.013	0.02	0.019	0.011
Grain fed daily per pig, lbs	3.12	3.70	4.13	1.6	1.42	1.61
Grain fed daily per 100 lbs. weight of pig, lbs.	2.68	3.19	3.63	2.20	2.36	2.03
Average mean weight per pig, lbs	116.0	116.0	114.0	73.0	60.0	79.0

Charging .3 cent per pig daily for alfalfa pasture shows the following:

Cost of alfalfa pasture per 100 lbs. gain.....	$0.35	$0.35	$0.37	$0.51	$0.55	$0.73
Total cost of 100 lbs. gain................	3.95	3.99	4.66	2.99	2.90	3.88

* There were 29 shoats put into this lot August 17 having a total weight of 1600 pounds, and 10 put in September 18 having a total weight of 810 pounds.

EXPERIMENT 19.

Record of pigs during summer of 1910.

The "Record of 20 old sows 1909 and 1910" and the "Record of 25 gilts 1909 and 1910" indicate that the cost of the first 50 pounds weight of the pigs was about $3.64 per 100 pounds. After that date some pigs were put on definite experiments and others held for later experiments. There is a record on 113 pigs for some time after they reached the 50-pound weight. They ran on alfalfa pasture and were given a full feed of soaked corn. The daily gain per pig was .72 pound. They ate 270 pounds of grain for 100 pounds of gain. The cost of the grain eaten for 100 pounds of gain was $2.27. The average number of days each pig was in the pasture during this time was 20. If we charge these pigs .2 of a cent each per day for pasture, or half as much as we charge old hogs on full feed, the cost of the alfalfa pasture per 100 pounds gain on these pigs was 21 cents. This makes the total cost of 100 pounds of gain $2.48.

A similar record on 97 pigs shows that they gained, on the average, daily .51 pound and ate 303.4 pounds of grain for 100 pounds of gain. The cost of grain to produce 100 pounds gain was $2.55. If we calculate the cost of the alfalfa as for the 113 pigs, this cost will raise the cost of 100 pounds of gain to $2.92. These pigs were not fed as much grain compared to their weight as the lot of 113. There should not be any comparisons drawn between these two lots, as the conditions of the pigs and feed were not the same for each lot, and the records are not such as to give very accurate comparisons. The history of these two lots is given to indicate the cost of gains of these pigs until they were divided into lots, on which the records could be kept more accurately. The average of these 210 pigs would indicate that the cost of 100 pounds increase in weight was $2.70. The following table gives the record on these pigs after they were separated into six lots. Comparisons should not be drawn too freely between these lots, as all conditions were not alike for all lots. The lots were selected and fed with the intention of making the pigs uniform in size and condition. Lot 48, for example, was composed of the small pigs, some of which were young.

The table shows that lot 48 was fed 6.09 pounds of grain daily per 100 pounds weight of the pigs. This is much more than we ordinarily consider a full feed. The ration was a mixture of grains and a small percentage of tankage. These pigs, which weighed on the average 87.5 pounds, ate 5.33 pounds of grain each, daily. Though this lot contained all the "scrubs" of the herd, the pigs had remarkable appetites, and being fed a large quantity of grain developed fast. By November there were only a few pigs that would be termed "scrubs." The average daily gain was .98 pound per pig. This was a faster gain than was made by any other lot, but this lot was fed on a different ration and fed more liberally. They received 545.5 pounds of grain for 100 pounds of gain. The grain for 100 pounds of gain cost $4.76. If we charge these pigs .2 cent per day for pasture, the total cost of grain and pasture for 100 pounds of gain would be $4.96. The cost of the increase in weight was quite high. The daily profit per pig was 1.1 cents, or only about one-third as much as that made by the other lots. This indicates that pigs may be "doing very well" and still be making but little profit.

The daily gain per pig on the other lots ranges from .90 pound to .96 pound and the amount of corn for 100 pounds of gain from 276 pounds to 420 pounds. These pigs were fed between a medium and a full ration of soaked corn. The amount daily per 100 pounds weight of the pig was from 2.33 pounds to 2.83 pounds. The cost of grain for 100 pounds of gain ranged from $2.32 to $3.53. The latter cost, which is much higher than that for the other lots, was for lot 49, on which the record is for only 6 weeks and that at the end of the pasture season. If we charge the pigs .2 cent each per day for pasture, we will make the total cost of feed for 100 pounds gain as follows: Lot 44, $2.80; lot 45, $2.90; lot 46, $2.54; lot 47, $2.98; lot 48, $4.96, and lot 49, $3.74. The total cost of 100 pounds gain for the 25 gilts kept for breeding, from June 29 to November 9, was $2.97. The average cost of grain and pasture for 100 pounds gain of all these lots is $3.31 per 100 pounds. At this time the pigs weighed on the average 158.5 pounds.

TABLE 7. *Cost of gains on grain and alfalfa pasture. Record of pigs during summer of 1910.*

LOT NO.	44	45	46	47	48	49
DATE	Jan. 29 to Nov. 8.	Aug. 9 to Nov. 8.	Aug. 9 to Nov. 8.	Aug. 9 to Nov. 8.	Aug. 9 to Nov. 8.	Sept. 20 to Nov. 1.
Ration (alfalfa pasture)	Corn	Corn	Corn	Corn	Mixed feed	Corn
Number pigs in lot	29	41	33	18	38	20
Number days in experiment	132	91	91	91	91	42
Average first weight, lbs	60	65.1	56.6	80	43	123.7
Average last weight, lbs	180	152.6	188 5	162.7	132	164.
Average gain, lbs	120	87.5	81.9	82.7	89	40.8
Average daily gain, lbs	0.91	0.96	0.9	0 908	0.98	0.96
Grain for 100 lbs. gain, lbs	307	320 3	276	328	545.5	420
Cost of grain for 100 lbs. gain	$2.58	$2.69	$2.32	$2.76	$4.76	$3.53
Profit on 100 lbs. gain	3.32	3.21	3.58	3.14	1.14	2.37
Profit per pig	3.98	2.81	2.93	2.60	1.01	0.96
Profit per pig daily	0.03	0.031	0.032	0.028	0.011	0.023
Grain fed daily per pig, gain	2.79	3.08	2.48	2.98	5.33	4.00
Grain fed daily per 100 lbs. weight of pig, lbs	2.33	2.83	2.55	2.45	6.09	2.77
Average mean weight per pig, lbs.	120	108.8	97.5	121.3	87.5	143.8
Price received per bushel grain	$1.07	$1.03	$1.19	$1.01	....	$0.78
Cost of gains, including pasture	2.80	2.90	2.54	2.98	$4.96	3.74

SUMMARY OF RECORD ON PIGS DURING SUMMERS.

The record in table 4 gives the data on 243 pigs during the pasture seasons of 1904 and 1906. The cost of 100 pounds of gain was $2.80. The record of 169 pigs in 1908, table 5, shows the cost of 100 pounds of gain to be $3.25. The record of 198 pigs in 1909, table 6, shows the cost to be $3.73. The record of 179 pigs in 1910 indicates that the cost of gains on them was at the rate of $3.31 per 100 pounds. The cost of 100 pounds gain varies greatly from year to year, but this is due to easily explained factors. During 1904 and 1906 the pigs were smaller when the tests began than during the later years; also, the tests were begun earlier in the season and therefore the pasture season was longer, and also the ration included less grain and as a result more alfalfa. Another important factor is that corn formed almost the entire grain ration in 1904 and 1906, while wheat and barley formed a considerable part of the ration in 1908, 1909, and 1910. These grains have always increased the cost in our experiments. A summary of these five years, where 792 pigs were fed various amounts of corn and other grains, indicates that the average cost of the grain and pasture for 100 pounds of gain was $3.30.

Cost of hogs when marketed (1909-'10).

The records of the 97 pigs and of the 113 pigs, in 1910, indicated that the increase in weight of these pigs from the time their weight averaged 50 pounds each until they were divided into the lots given in table 6 cost $2.79 per 100 pounds. If we disregard these figures and consider the cost during that time the same as during the time covered by table 6, we find that the cost of 100 pounds gain of these pigs between the weight of 50 pounds and 158 pounds was $3.31. The cost of the first, 50 pounds was at the rate of $3.64 per 100 pounds.

The cost of 100 pounds of gain varied from November 8 until the hogs were marketed, on account of the ration and the marketing weight. As corn and alfalfa hay fed in a rack is a common ration, we shall consider the lot fed that ration. This is lot 67. The cost of 100 pounds gain between the weights of 168 pounds and 227 pounds was $3.21, and between the weights of 227 pounds and 326 pounds $4.04. If the hog had been marketed at 225 pounds weight, the cost of the feed required to produce him and develop him to that weight would have been $7.55, or $3.35 per 100 pounds. If these hogs had not been marketed until they had reached the average weight of 325 pounds, the cost would have been at the rate of $3.57 per 100 pounds. While the continuity of this record was broken by the necessity of putting the pigs into lots to throw light on other problems, yet we feel that data at our command indicate that the cost given above is fairly accurate.

SUMMARY.

The following statements are based on the results of the preceding experiments and should be considered in the light of the foregoing discussion. All pertain to feeding hogs on alfalfa pasture or when alfalfa hay is supplied under conditions comparable with those existing at the Substation at North Platte, Neb.

Part I.

The cost of the feed for keeping old sows from the time one spring litter has reached an average weight of 50 pounds per pig until the next spring litter has reached the same weight is about $20 per head. This includes the cost of feed eaten by the pigs until their average weight is

50 pounds. The increase in the weight of yearling and two-year-old sows during the year will in part repay the cost of keeping them.

The cost of keeping young sows from the time they weigh 50 pounds each until their first spring litters average 50 pounds each per pig is greater than the cost of keeping old sows, but the increase in the weight of the young sows above the increase in the weight of the old sows makes the net cost of keeping young sows less than that of keeping old sows.

The cost of keeping a sow one year and the cost of keeping her pigs until their average weight was 50 pounds, in these tests, was equal to $4.26 for each 100 pounds weight of the pigs when their average weight was 50 pounds. The cost of the 50-pound pig as here calculated was $2.13. In this account the sow was given credit for her increase in weight during the year. The investment and labor were not considered.

The data at command do not show the relative cost of the 50-pound pig produced by the old sow and the one produced by the young sow, as the herd of old sows included only the better half of the herd of the young sows of the previous year, with a few older sows kept on account of their good records.

Part II.

The record during five summers on a total of 792 pigs indicates that the cost of grain and pasture for 100 pounds increase in weight was $3.30. This does not take into account unusual risk on the pigs, equipment, labor, or interest on investment.

A summary of the results recorded in this bulletin, together with data from Bulletin No. 123, indicates that the cost of feed to produce a 225-pound market hog was $3.35 per 100 pounds, and that keeping the hog until it weighed 325 pounds increased the cost to $3.57 per 100 pounds. This includes only the cost of feed and does not include the cost of labor, equipment, unusual risk, or interest on investment.

FATTENING HOGS IN NEBRASKA.

From Nebraska Experiment Station Bulletin No. 123, by W. P. SNYDER, Superintendent.

INTRODUCTION.

Bulletin No. 121 gives data on the cost of keeping brood sows, the cost of the 50-pound pigs, and the cost of growing the pigs during the summer on alfalfa pasture and grain. The present bulletin deals with the pig during the fattening period.

One of the chief problems before the pork producer is that of the most profitable use of alfalfa in the fattening ration. During the past several years this Substation has been conducting experiments to throw light on this problem. Part I of this bulletin deals entirely with this problem. The results of previously reported experiments are summarized and the results of the later experiments are given in detail.

The results of several tests in which other grains and mill products are supplemented for a part of the corn in a ration of corn and alfalfa are given in Part II.

The proper standard from which to determine the most profitable ration is the amount of feed of a certain kind required to produce a unit of increase in weight and the rate at which the increase is made. These are the same in all parts of the country, while the cost of the various kinds of feed, and therefore the cost of gains from the various feeds, will vary in almost every locality. In the tables we have endeavored to give all the data necessary for the farmer to calculate the most economical ration under his conditions. The cost of gains and the profit under the conditions at North Platte have also been given.

We have taken as the price of hogs the average price we have received for hogs at North Platte during the six years preceding 1911. This price was $5.90 per 100 pounds on home weights. The average price paid for corn during the same time is used as the proper price for corn in this bulletin. This is 47 cents per bushel. The prices of the other kinds of feed are those which we consider to be the market prices prevailing here. It might be necessary to purchase the mill products in carload lots in order to deliver them at North Platte at these prices.

The prices used in calculating the results are as follows:

Hogs, per 100 pounds	$5 90
Corn, per bushel	47
Wheat, per bushel	70
Barley, per bushel	40
Emmer, per bushel	35
Rye, per bushel	56
Milo, per bushel	50
Cane, per bushel	50
Oil meal, per ton	30 00
Tankage, per ton	40 00
Bone meal, per ton	30 00
Shorts, per ton	24 00
Alfalfa meal, per ton	15 00
Chopped alfalfa, per ton	10 00
Alfalfa hay, per ton	8 00

The cost of alfalfa pasture has not been considered in the majority of the tables, but has been mentioned in the discussion in connection with the tables. The cost of the pasture depends on the size of the hog and on the amount of grain being fed, as well as on many other conditions. We have considered it as 25 cents per month or .8 cent per day per hog not being fed grain, or one-half that amount for hogs fed about a full grain ration. Pigs have been charged less.

Feed other than alfalfa is termed "grain" in the tables. Where chopped alfalfa or alfalfa meal was a part of any ration in the experiment, all the grain was ground. The alfalfa meal was mixed with the grain; the chopped alfalfa was put in the trough and the grain poured over it. The feed was moistened with water after being put into the trough. The feed was weighed separately for each lot, at each feeding time.

The hogs had access to water at all times, unless the weather was such that the water froze quickly. During such times water was supplied three times each day, or as often as there was any indication that the hogs cared for it. Water was supplied in the fields by means of a gravity water system that kept fresh water in cement troughs at all times.

In all experiments the hogs were weighed every second week.

The "mean" weight is the average of the first and last weights in the period of the experiment.

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PART I.

ALFALFA WITH CORN FOR FATTENING HOGS.

Experiments conducted by the various experiment stations as well as the experience of the most successful hog growers, have shown conclusively that corn alone is not as profitable a ration for fattening hogs as corn fed with a smaller portion of some food containing less starch and more protein. The food that should be used with corn depends largely on the price of foods having a high pretein content. Experiments conducted at this Station indicate that when alfalfa is available corn and alfalfa form the most profitable ration. The high value of alfalfa hay with corn for fattening hogs has been recognized for several years, but there have been few experiments conducted until recently to determine the most profitable way to feed the alfalfa.

On the following pages there is given a summary of the results of five years' work in feeding alfalfa with corn for fattening hogs. All these experiments were conducted during the winter time with pigs farrowed during the previous spring and grown during the summer on alfalfa pasture and less than a full feed of grain.

Results in 1904.

The results of the first experiments were published in September, 1904. The test was conducted during the previous winter. This experiment began on January 2, 1904, and continued for 12 weeks. At the beginning of the experiment the pigs weighed about 80 pounds each, and at the close of the experiment about 175 pounds each.

There were 8 lots of 7 pigs each in the test. The rations were as follows:

Corn meal—
  3 parts corn meal and 1 part shorts.
  3 parts corn meal and 1 part chopped alfalfa hay.
  3 parts corn meal and 1 part bran.
  1 part corn meal and 1 part shorts.
  1 part corn meal and 1 part chopped alfalfa.
  1 part corn meal and 1 part alfalfa meal.

The daily gain per pig varied from .8 of a pound for those fed 3 parts corn meal and 1 part bran to 1.09 pounds for those fed 3 parts corn meal and 1 part shorts. The cost of 100 pounds of gain varied from $3.60 for the hogs fed 3 parts corn and 1 part chopped alfalfa to $4.34 for those fed 3 parts corn and 1 part shorts, and $5.59 for those fed 1 part corn and 1 part shorts. The cost of 100 pounds of gain on the hogs fed corn alone was $4.17.

In this test a ration of 3 parts corn and 1 part alfalfa or shorts gave better results than a ration of one-half corn and one-half alfalfa or shorts. The ration consisting of 3 parts corn and 1 part chopped alfalfa gave the cheapest gains and the most profit per hog, though not quite so rapid gains as the ration of 3 parts corn and 1 part shorts. Alfalfa meal and corn also gave more satisfactory results than shorts and corn or bran and corn. This experiment indicates that alfalfa is a more profitable supplementary feed with corn for fattening hogs than shorts or bran.

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Results in 1906-'07.

The second experiment was carried on during the winter of 1906-'07. The results were reported in Bulletin No. 99. There were 6 lots of 10 pigs each in this test. They were fed for 3 months. Corn was compared with corn and alfalfa hay fed in a rack and with 3 parts corn and 1 part chopped alfalfa. These lots were duplicated, using barley in place of corn. All grain was ground. The pigs weighed about 130 pounds each at the beginning of the test, and 240 pounds each at the close. The hogs getting alfalfa hay in the rack made the fastest and cheapest gains and the most profit per pig. Those receiving 3 parts corn and 1 part chopped alfalfa ranked second, and corn alone third. This experiment confirmed the results of the former experiment in showing that alfalfa and corn make a more profitable fattening ration for hogs than corn alone.

Results of 1908 to 1911.

During three winters, 1908 to 1911, extensive tests were made to determine the most profitable way of feeding alfalfa with corn. The following rations were compared:

Corn—
  Corn and alfalfa hay in a rack.
  9 parts corn and 1 part chopped alfalfa.
  9 parts corn and 1 part alfalfa meal.
  3 parts corn and 1 part chopped alfalfa.
  3 parts corn and 1 part alfalfa meal.
  1 part corn and 1 part chopped alfalfa.
  1 part corn and 1 part alfalfa meal.

The corn was ground and mixed with the alfalfa meal and chopped alfalfa. The feed was moistened in the trough. In these tests there were 10 pigs in each lot. The weight of the pigs at the beginning of the test was about 115 pounds, and at the close about 225 pounds. The experiments continued for about 3 months, or from November 1 to February 1.

We here bring together the results of the several experiments, in order to make as accurate comparisons as possible of the results of the various ways of feeding alfalfa. Each ration mentioned above is represented by lots from the same experiments in each group below. Therefore the comparisons within each group should be fair. An accurate record of the alfalfa hay fed in the rack was not always available. It is probable that the cost of this ration may be slightly higher than given here. It should be remembered that the following prices have been used in this bulletin: corn 47 cents per bushel, alfalfa hay $8 per ton, chopped alfalfa $10 per ton, and alfalfa meal $15 per ton. It should also be noted that in these groups we have given the amount of grain required for 100 pounds of gain, but not the amount of grain and alfalfa, though the cost of 100 pounds of gain includes the cost of both grain and alfalfa.

We wish to show by group A the results of a ration of 1 part of alfalfa and 1 part of corn as compared with a ration containing less than one-half alfalfa or no alfalfa, and to compare chopped alfalfa with alfalfa meal where the ration is one-half alfalfa. In this group we have the average results of two experiments, in each of which there were 7 lots of 10 pigs each, or a total of 140 pigs.

GROUP A.

Comparison of the following rations for fattening hogs:

Corn—

Corn and alfalfa hay in a rack.
9 parts corn and 1 part chopped alfalfa.
9 parts corn and 1 part alfalfa meal.
3 parts corn and 1 part chopped alfalfa.
3 parts corn and 1 part alfalfa meal.
1 part corn and 1 part chopped alfalfa.
1 part corn and 1 part alfalfa meal.

TABLE 1. *Comparison of rations for fattening hogs. Average of two tests.*

RATION.	Average first weight.	Average last weight.	Average daily gain.	Grain for 100 lbs. gain.	Cost of 100 lbs. gain.	Profit per pig daily.
	Lbs.	*Lbs.*	*Lbs.*	*Lbs.*		
Corn	118.7	220.7	1.08	518	$4 85	$0 016
Corn and alfalfa hay in racks	118.5	234.5	1.18	448	3 81	026
Corn 9 parts, chopped alfalfa 1 part,	120.0	245.8	1.31	441	3 94	025
Corn 3 parts, chopped alfalfa 1 part.	118.2	227.2	1.11	435	4 85	017
Corn 3 parts, alfalfa meal 1 part	115.0	230.7	1.20	403	4 39	019
Corn 1 part, chopped alfalfa 1 part.	115 2	190.0	.78	355	4 76	009
Corn 1 part, alfalfa meal 1 part.	115 2	195 4	.82	346	5 49	004

A study of this group shows that gains made by the rations containing one-half alfalfa were much slower and more expensive than gains obtained from any of the other rations. The last column in this group shows that the profit per pig daily on those fed half alfalfa and half grain was less than on the other lots. These comparisons indicate that one-half alfalfa and one-half corn was the least profitable ration fed.

The hogs fed half alfalfa and half corn were not in a marketable condition when the hogs on the other rations were ready for the market. It seemed evident that a ration of half alfalfa and half corn would not fatten these hogs. They were therefore given more grain and less alfalfa until fat. The profit on them from the time they were taken from the pastures in the fall until they were ready for the market was less than on the hogs fed no alfalfa or fed less than half alfalfa. The tests during the two winters showed that a fattening ration should contain less than half alfalfa. However, a ration of one-half alfalfa and one-half corn has been found quite satisfactory for wintering old brood sows.

By comparing chopped alfalfa with alfalfa meal where one-half the ration was alfalfa, we find that the alfalfa meal gave faster gains with less grain than chopped alfalfa, but that the profit from alfalfa meal was less than from chopped alfalfa because of the higher price of the meal.

In group A we have shown that a ration containing half alfalfa is not suitable for fattening hogs. In group B we wish to compare the effects of rations containing one-fourth alfalfa with a ration of corn alone and with rations containing less than one-fourth alfalfa. This group also shows the relative values of chopped alfalfa and alfalfa meal when the ration is 1 part alfalfa and 3 parts corn. In this group we have the average results of four tests, in each of which there were 10 pigs on each ration. This gives us the results of comparisons with 160 pigs.

GROUP B.

Comparison of the following rations for fattening hogs:

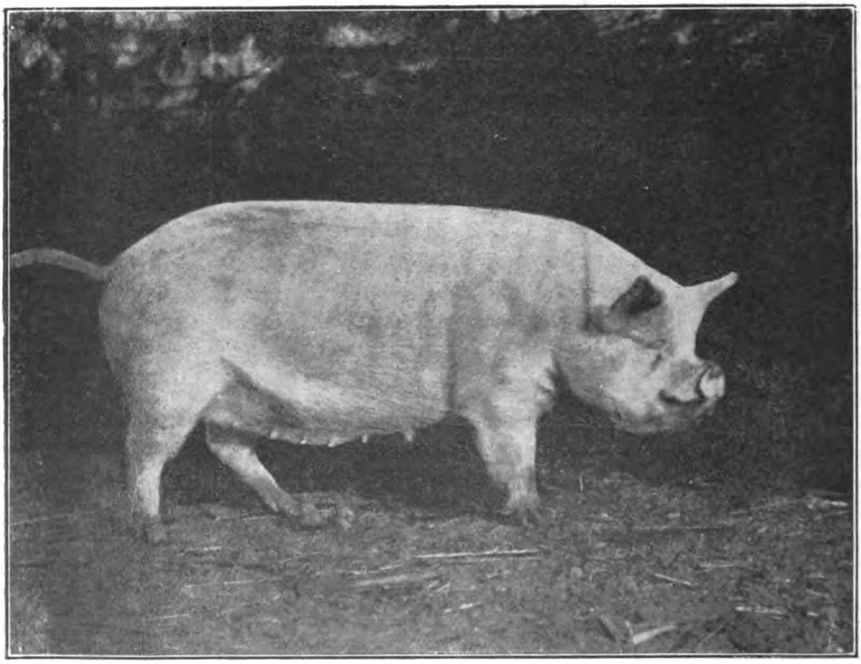
Corn—
9 parts corn and 1 part chopped alfalfa.
3 parts corn and 1 part chopped alfalfa.
3 parts corn and 1 part alfalfa meal.

Table 2. *Comparison of rations for fattening hogs. Average of four tests.*

Ration.	Average first weight.	Average last weight.	Average daily gain.	Grain for 100 lbs. gain.	Cost of 100 lbs. gain.	Profit per pig daily.
	Lbs.	*Lbs.*	*Lbs.*	*Lbs.*		
Corn	137.4	259.1	1.35	492	$4 13	$0 025
Corn 9 parts, chopped alfalfa 1 part.	138.0	275.5	1 52	429	3 83	031
Corn 3 parts, chopped alfalfa 1 part.	136.0	240.9	1.14	426	4 28	018
Corn 3 parts, alfalfa meal 1 part	134.6	252.5	1.30	400	4 36	020

In this group we find that rations containing one-fourth alfalfa produced slower gains that a ration of corn alone or of 9 parts of corn and 1 part of alfalfa.

The hogs fed 1 part chopped alfalfa and 3 parts corn ate 66 pounds less corn to produce 100 pounds of gain than hogs fed entirely on corn, and the hogs fed 1 part alfalfa meal and 3 parts corn ate 92 pounds less corn to produce 100 pounds gain than those fed entirely on corn. But



A Yorkshire gilt.

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there were required 142 pounds of chopped alfalfa to replace the 66 pounds of corn, and 133 pounds of alfalfa meal to replace the 92 pounds of corn. Sixty-six pounds of corn cost 55 cents, and 142 pounds of chopped alfalfa cost 71 cents. Ninety-two pounds of corn cost 77 cents and 133 pounds of alfalfa meal cost 99 cents. This shows that the alfalfa used to take the place of the corn cost more than the corn it replaced, without making as fast gains. The cost of 100 pounds of gain from a ration of 1 part alfalfa and 3 parts corn was greater than from a ration of corn alone. The daily gain and the profit per pig during the fattening period were less when the ration was 1 part alfalfa and 3 parts corn than when corn alone. It would seem that a ration containing one-fourth alfalfa is not as satisfactory for fattening hogs as a ration of corn alone. A study of this group also shows that a ration containing 1 part alfalfa and 3 parts corn is not as profitable as a ration containing a larger proportion of corn and a smaller proportion of alfalfa.

A study of the effects of chopped alfalfa and alfalfa meal where the ration is 1 part alfalfa and 3 parts corn shows that the alfalfa meal produced faster gains than chopped alfalfa and more profit per hog during the fattening period, though the cost of gain was increased slightly. This places alfalfa meal ahead of chopped alfalfa where the ration is one-fourth alfalfa and the prices are those used in this bulletin.

It might be advisable to feed one-fourth alfalfa until toward the end of the fattening period, and then feed less alfalfa. The hogs fed 1 part alfalfa and 3 parts corn would have required 25 to 50 pounds more flesh each to have put them in the same condition as the hogs fed corn alone, or corn and less than one-fourth alfalfa.

In group A we have shown that a ration of half alfalfa and half corn was less profitable for fattening hogs than corn alone, or corn and less than half alfalfa. In group B we have shown that a ration of 1 part alfalfa and 3 parts corn is less profitable than a ration of corn alone or corn and less than one-fourth alfalfa. In group C we wish to compare a ration of corn alone with rations containing 9 parts of corn and 1 part of alfalfa, and also to compare chopped alfalfa and alfalfa meal where each forms one-tenth of the ration. In this group we have the average results of three tests, in each of which there were 10 pigs fed each of the rations. The average duration of each test was 94 days. Ninety pigs are compared in this group.

GROUP C.

Comparisons of the following rations for fattening hogs:

Corn—
  9 parts of corn and 1 part chopped alfalfa.
  9 parts of corn and 1 part alfalfa meal.

TABLE 3. *Comparison of rations for fattening hogs. Average of three tests.*

RATION.	Average first weight.	Average last weight.	Average daily gain.	Grain for 100 lbs. gain.	Cost of 100 lbs. gain.	Profit per pig daily.
	Lbs.	*Lbs.*	*Lbs.*	*Lbs.*		
Corn	137.3	266	1.40	483	$4 04	$0 027
Corn 9 parts, chopped alfalfa 1 part,	136.3	283	1.58	425	3 80	033
Corn 9 parts, alfalfa meal 1 part	134.3	283.6	1.59	431	3 97	031

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The average results of the lots fed alfalfa show the following when compared with the lot fed corn only: The hogs fed alfalfa gained .18 of a pound more per head daily and required 55 pounds less grain to produce 100 pounds of gain than those which were fed corn alone. The 55 pounds of corn were replaced by 47 pounds of alfalfa. Fifty-five pounds of corn cost 46 cents and 47 pounds of chopped alfalfa 23 cents, or 47 pounds of alfalfa meal 35 cents. The substitution of alfalfa for corn increased the rate of gains, and reduced the cost of gains 16 cents per 100 pounds. The profit per pig during the fattening period was greater when the ration contained one-tenth alfalfa than when it was all corn.

In these tests, where the alfalfa formed one-tenth of the rations, the chopped alfalfa and the alfalfa meal gave almost the same gains, with about the same amount of feed for 100 pounds of gain, but since the alfalfa meal cost more than the chopped alfalfa the cost of 100 pounds of gain was greater and the profit per pig less when alfalfa meal was fed than when chopped alfalfa was fed.

The comparisons given in this group indicate quite strongly that a ration containing 9 parts of corn and 1 part alfalfa is more profitable than a ration of corn alone, and that in such a ration chopped alfalfa is preferable to alfalfa meal.

In groups A and B, the results indicated that rations containing one-half or one-fourth alfalfa with corn were not as profitable for fattening hogs as one of corn alone. In group C the results indicated that a ration containing 9 parts of corn and 1 part of chopped alfalfa or alfalfa meal was more profitable than a ration of corn alone. In group D we offer a comparison of rations of corn alone, corn and alfalfa hay fed in a rack, and a ration of 9 parts corn and 1 part chopped alfalfa. In this group we have the average results of three experiments, in each of which there were 10 pigs on each ration. The experiment continued for 92 days. Ninety pigs are compared in this group.

GROUP D.

Comparisons of the following rations for fattening hogs:

Corn—
Corn and alfalfa hay fed in a rack.
9 parts corn and 1 part chopped alfalfa.

TABLE 4. *Comparison of rations for fattening hogs. Average of three tests.*

RATION.	Average first weight.	Average last weight.	Average daily gain.	Grain for 100 lbs. gain.	Cost of 100 lbs. gain.	Profit per pig daily.
	Lbs.	*Lbs.*	*Lbs.*	*Lbs.*		
Corn	135.3	249.8	1.27	506	$4 25	$0 022
Corn and alfalfa hay in rack	135.1	270.9	1.50	436	3 78	032
Corn 9 parts, chopped alfalfa 1 part.	136.5	269.2	1.46	433	3 87	029

A comparison of the averages given in this group shows that nearly the same amount of grain was required to produce 100 pounds of gain where the hogs were fed 9 parts of corn and 1 part of alfalfa as where the alfalfa was fed in the rack. There was approximately the same

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amount of alfalfa fed in each case, but more wasted in the rack than when mixed with the grain.

A comparison of the results of feeding a ration of corn with alfalfa in the rack and a ration of 9 parts of corn to 1 part of chopped alfalfa shows that these two ways give quite similar returns, but with the balance in favor of feeding the alfalfa without chopping. Where the alfalfa was fed in the rack the gain was faster and cheaper and the profit per hog more than where the alfalfa was chopped and fed with the corn.

The results of 5 years' tests indicate that for fattening hogs the way to feed alfalfa most satisfactorily is to feed it without grinding or chopping. This method has given faster and cheaper gains than feeding a like amount of chopped or ground alfalfa, or a larger percentage of either.

By feeding alfalfa hay with the corn the cost of the increase in the weight of the hogs has been decreased about 50 cents per 100 pounds.

When corn was fed alone, 9 bushels of corn made 100 pounds of gain. When alfalfa hay was fed with the corn, 8 bushels of corn and 50 pounds of hay made 100 pounds of gain. The 50 pounds of hay was worth more in the ration than a bushel of corn, as it made a trifle more gain and made it considerably faster. This is also true of chopped alfalfa or alfalfa meal when fed in the proportion of 1 part alfalfa to 9 parts of corn (groups C and D). When the ration was 1 part alfalfa and 3 parts corn, 7.2 bushels of corn and 138 pounds of alfalfa made 100 pounds of gain (group B). When the ration was 1 part alfalfa and 1 part corn, 6.25 bushels of corn and 350 pounds of alfalfa made 100 pounds of gain (group A).

Alfalfa meal gave slightly faster but more costly gains and less profit per pig than chopped alfalfa when the rations were 1 part alfalfa and 9 parts corn.

Alfalfa meal produced faster and cheaper gains and gave more profit per pig than chopped alfalfa when the rations were 1 part alfalfa meal and 3 parts corn.

Alfalfa meal produced faster but more costly gains and less profit per pig than chopped alfalfa when the rations were 1 part alfalfa and 1 part corn. It is probable that the slight differences between chopped alfalfa and alfalfa meal are within the limits of experimental error and are due to slight differences in the quality of the hay from which they were made. The alfalfa meal generally gave faster gains, but only once did it give cheaper gains.

We would rank the rations tried in these experiments as follows for fattening hogs, under the conditions reported in this bulletin:

Corn and alfalfa hay in a rack—
  9 parts corn and 1 part chopped alfalfa.
  9 parts corn and 1 part alfalfa meal.
Corn.
  3 parts corn and 1 part alfalfa meal.
  3 parts corn and 1 part chopped alfalfa.
  1 part corn and 1 part chopped alfalfa.
  1 part corn and 1 part alfalfa meal.

The results given have considered only the cost of the feed when ready to be fed. The relative cost of handling the alfalfa in the rations tested, while feeding, has not been considered. To feed either meal or chopped alfalfa, the grain should be ground and mixed with the alfalfa, then moistened in the trough. The dust in the alfalfa meal makes it very disagreeable to mix with grain. The chopped alfalfa does not contain the dust but requires time and labor to mix it. Either requires more time and labor than feeding corn in the ear or shelled, and feeding the alfalfa in a rack or on a feeding floor.

After studying, for several years, the problem of feeding alfalfa hay to hogs we would recommend the following:

Feed a good quality of fourth cutting if possible. If this can not be obtained, feed the finest and brightest hay obtainable.

Feed the hay in a rack from which it may be eaten easily, or feed twice or three times daily on hard soil or a feeding floor, throwing aside the refuse left over from the last feed.

Give the hogs an abundance of alfalfa. Do not try to make them eat the coarse stems. They will eat corn in preference and not eat as much alfalfa as is desirable. Feed the coarse stems to the cattle and horses.

PART II.

COMPARISONS OF CORN, CORN AND ALFALFA, AND SUPPLEMENTARY FOODS, FOR GROWING AND FATTENING HOGS.

EXPERIMENT 23.

Corn and alfalfa compared with corn, wheat and alfalfa, for growing and fattening hogs.

On July 18, 1908, 60 shoats were divided into two uniform lots of 30 each. The average weight was 64.6 pounds. Each lot was fed 3 pounds of grain daily for each 100 pounds of its weight until January 2, 1909. From July 18 until November 7 the pigs grazed on alfalfa pastures. After that date chopped alfalfa was added to the grain ration. This equaled in weight one-fourth the weight of the grain ration, or was 20 per cent of the entire ration. The grain for one lot was corn and for the other lot half corn and half wheat. The grain was ground before being fed, and, except in the coldest weather, was soaked 12 hours. When not soaked it was moistened after being put into the trough. The chopped alfalfa was mixed with the grain in the trough.

On November 7, when these hogs were taken from the pastures to their winter quarters, the average weight of the pigs fed corn was 166 pounds, and of those fed corn and wheat 172 pounds. The pigs fed corn and wheat gained 6 pounds more per head in 112 days while on alfalfa pasture than those fed corn. The daily gain of the pigs fed corn was .90 of a pound, and of those fed corn and wheat .96 of a pound. Wheat was valued at 70 cents per bushel and corn at 47 cents per bushel. The pigs fed corn ate 6.5 bushels of grain and those fed corn and wheat ate 5.9 bushels of grain for each 100 pounds of increase in weight. The 6.5 bushels of corn cost $3.07; the 5.9 bushels of corn and wheat cost $3.43. Therefore the cost of the grain eaten to produce 100 pounds increase in weight was 36 cents less when the grain was all corn than when it was half corn and half wheat. The profit on the pigs fed corn was 19 cents more per head during the summer than on those fed corn and wheat.

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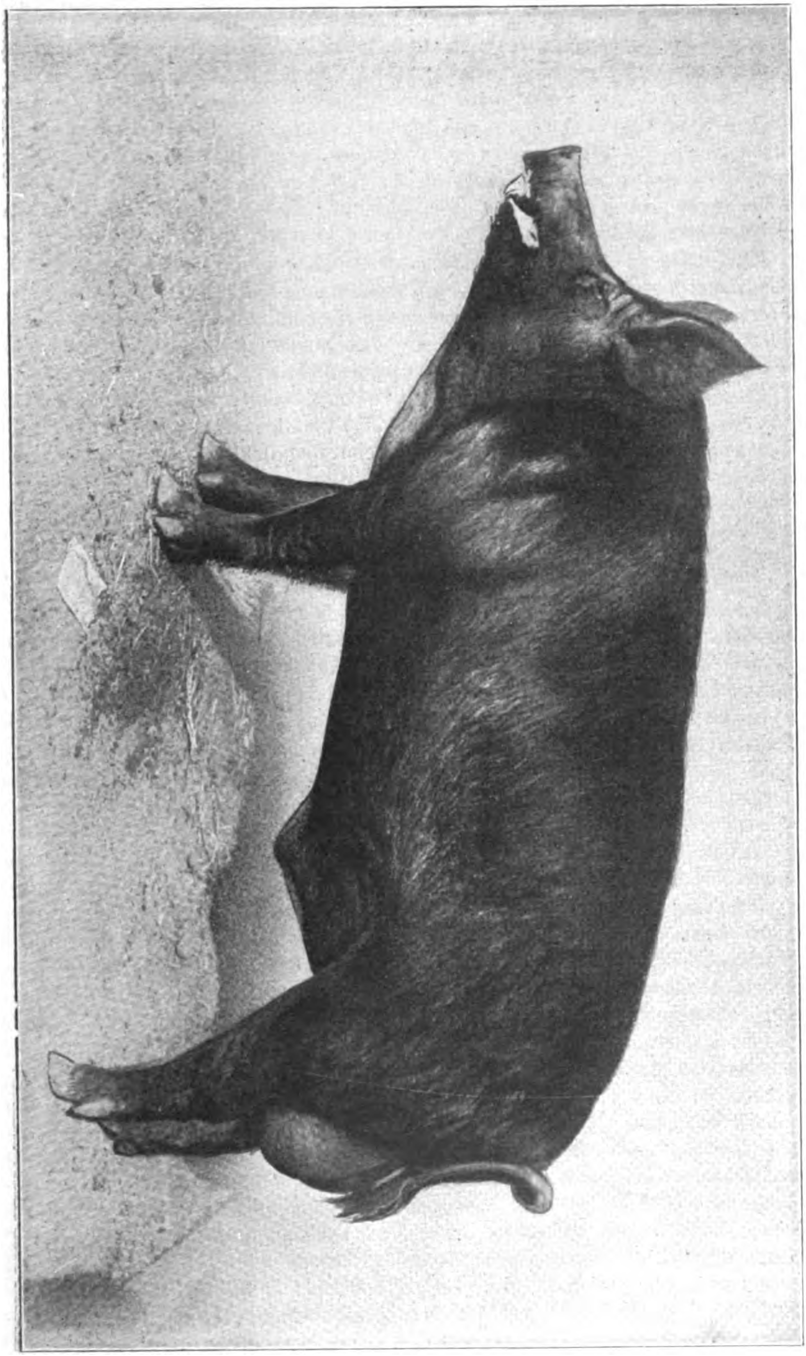

A seven-times sweepstakes-winning Tamworth boar.

If we charge the pigs .3 of a cent per head daily for pasture, the cost of grain and pasture for 100 pounds gain for those fed corn was $3.40, and for those fed corn and wheat $3.74. These pigs ate a little more than 3.25 pounds of grain per head daily. They were fed about 2.75 pounds of grain daily per 100 pounds of their weight. At the beginning of the experiment, when the pigs averaged in weight 64 pounds each, 1 bushel of grain was fed daily to 32 pigs, and at the close, when the average weight was about 170 pounds per head, 1 bushel of corn was fed daily to about 12 pigs.

This part of the experiment showed that it was more profitable to feed corn alone to pigs running on alfalfa pasture than to feed half corn and half wheat, when wheat was worth 70 cents per bushel and corn 47 cents per bushel. If the wheat had been worth only 57 cents, the ration of corn and wheat would have been as profitable as the ration of corn alone.

When these two lots containing 30 pigs each were taken from the pastures, November 7, they were put into small corrals and their rations changed so that each lot got 1 pound of chopped alfalfa with each 4 pounds of grain. The one lot continued to get corn and the other lot corn and wheat. They were given all the feed they would eat. These rations were fed for 56 days. At the end of that time, January 2, 1909, the average weight of those fed corn was 240 pounds and of those fed corn and wheat 244.8. During the winter period, from November 7 to January 2, the daily gain per head of those fed corn was 1.32 pounds and of those fed corn and wheat 1.28 pounds. There were required of the corn 7.96 bushels and of the corn and wheat 7.88 bushels to produce 100 pounds gain. The 7.96 bushels of corn cost $4.20; the 7.88 bushels of corn and wheat cost $5.03. There was $1.26 profit on each pig fed corn and 63 cents profit on each pig fed corn and wheat. During the fattening period when the ration was 1 part alfalfa and 4 parts grain, corn produced faster and cheaper gain and twice as much profit per pig as corn and wheat. On the average these two lots of hogs ate 3.40 pounds of feed, alfalfa and grain, daily for 100 pounds of their weight. The hogs ate about 7 pounds of feed daily per head.

Combining these two periods, we have the record of two uniform lots of 30 shoats each, from July 18, 1908, when their average weight was 64 pounds, until January 2, 1909, when their average weight was 240 pounds. The treatment of the two lots was the same, except that one was fed corn and the other lot half corn and half wheat. The pigs fed corn and wheat gained 5 pounds per head more than those fed corn, and required 12 pounds less grain for 100 pounds of gain. 7.16 bushels of corn with alfalfa, or 6.71 bushels of corn and wheat with alfalfa, produced 100 pounds of gain. The cost of the 100 pounds of gain from corn was $3.55, and from corn and wheat $4.08. The profit per hog grown and fattened on corn and alfalfa was 83 cents more than on the hogs grown and fattened on corn, wheat and alfalfa. If corn had been 47 cents per bushel and wheat 60 cents per bushel, the corn and wheat ration would have returned the same profit as the ration of corn alone. If corn had been 54.8 cents per bushel and wheat 70 cents per bushel, the two rations would have given equal profits. After deducting the cost of the alfalfa,

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there was received for each bushel of corn fed 79 cents, and for each bushel of wheat 97 cents.

This indicates that where wheat and corn are fed in equal proportions to growing and fattening hogs the gain will be faster and with a less number of pounds of grain than where corn forms the entire grain ration, when alfalfa forms a considerable part of both rations; but owing to the higher price of wheat, corn alone gives cheaper gains and greater profit.

EXPERIMENT 24.

Corn and alfalfa compared with corn, barley and alfalfa, for growing and fattening hogs.

This experiment was quite similar to the one preceding, except that in this test barley was fed instead of wheat. There were two lots of 30 pigs each, fed from August 31, 1909, to January 26, 1910, or from the time the pigs weighed 86 pounds each until they weighed 230 pounds each. One lot was fed corn and the other lot half corn and half barley. Both lots ran in alfalfa pastures until November 9. From that date until the end of the experiment they were in dry lots and were fed chopped alfalfa with the grain. The lot fed corn and barley was given more grain than the other lot, in order to keep the two lots at near the same weight.

While on alfalfa pasture the pigs gained .8 of a pound each daily. Those fed corn gained 3 pounds per head more than those fed corn and barley, and ate 81 pounds less of grain for each 100 pounds gain. There were required to produce 100 pounds increase in weight 7.7 bushels of corn, or 10 bushels of corn and barley. The 7.7 bushels of corn cost $3.64; the 10 bushels of corn and barley $4.29. If we charge the pigs .3 of a cent daily for pasture, the cost of grain and pasture to produce 100 pounds of gain when the ration was corn was $3.99, and when the ration was corn and barley $4.66. The barley increased the cost of 100 pounds gain 67 cents. The pigs fed corn ate 3.7 pounds per head daily, or 3.19 pounds per head daily per 100 pounds of their weight, and those fed corn and barley, 4.13 pounds per head daily, or 3.61 pounds daily per 100 pounds of their weight.

When the pigs were taken from the alfalfa pastures, on November 7, they were placed in dry lots. They were fed 1 pound of chopped alfalfa with each 4 pounds of grain until January 9, when the rations were changed to 1 part of chopped alfalfa and 9 parts of grain. The grain was ground, mixed with the chopped alfalfa, and moistened in the trough. During this time the one lot was fed 5.17 pounds of corn daily per pig, and the other lot 5.31 pounds of corn and barley daily per pig. The pigs fed corn gained 90 pounds each, or 1.15 pounds each, daily; those fed corn and barley gained 86 pounds or 1.11 pounds each daily. The cost of 100 pounds of gain on those fed corn was $4.11, and on those fed corn and barley $4.38. Barley increased the cost of 100 pounds of gain 28 cents. There were required 32 pounds less of corn than of corn and barley to produce 100 pounds of gain.

During these 5 months, August 31, 1909, to January 26, 1910, the hogs fed corn gained 7 pounds more per head than those fed corn and barley. If the same proportion of feed to weight of hog had been fed to each lot throughout, or if all pigs had been given a full feed throughout, the gain of those fed corn over those fed corn and barley would have been considerably greater. The hogs fed corn produced 100 pounds of increase in weight from 7.8 bushels of corn with alfalfa, at a cost of $3.92. Those fed corn and barley produced 100 pounds increase in weight from 9.4 bushels of corn and barley with alfalfa hay, at a cost of $4.36. The profit per head in the lot fed corn was 78 cents more than in the lot fed corn and barley. The hogs fed corn returned a value of 72 cents per bushel for the corn eaten. If those fed corn and barley were charged 72 cents per bushel for the corn eaten, they would return a value equal to 48 cents for each bushel of barley eaten. If barley had been worth 31.3 cents per bushel, the profits of the two lots would have been practically the same. In this experiment, where alfalfa formed a considerable part of the ration, corn gave faster and more economical gains and also more net profit than a ration of half corn and half barley.

EXPERIMENT 25.

Comparison of tankage, bone meal, shorts, and alfalfa, as supplements to corn for fattening hogs.

During the winter of 1908 and 1909 tests were made of rations containing digester tankage, steamed bone meal, and shorts, with alfalfa, in comparison with corn alone and with corn and alfalfa. There were five lots of 10 pigs each. The experiment began December 5, 1908, and ended March 11, 1909, having continued 96 days, or over three months. The rations were as follows:

Lot 77, 100 parts corn.
Lot 78, 90 parts corn and 10 parts alfalfa meal.
Lot 79, 85 parts corn, 10 parts alfalfa meal, and 5 parts tankage.
Lot 80, 85 parts corn, 10 parts alfalfa meal, and 5 parts bone meal.
Lot 81, 65 parts corn, 10 parts alfalfa meal, and 25 parts shorts.

The grain was ground, and the feed mixed and moistened in the troughs. Our intention was to give the same amount of feed to each lot, but the pigs getting tankage were so anxious for more feed than the other pigs would eat that we finally allowed them more.

The average initial weight of these lots was 125 pounds per pig, and the average final weight 237 pounds per pig. The average daily gain per pig was 1.17 pounds.

The lots are ranked below according to the rapidity of gain, economy of gain, and profit per pig.

Ranked according to rapidity of gain.	Gain per pig.
Lot 79, fed 85 parts corn, 10 parts alfalfa meal, and 5 parts tankage	127 lbs.
Lot 78, fed 90 parts corn and 10 parts alfalfa meal	122 "
Lot 77, fed 100 parts corn	108 "
Lot 81, fed 65 parts corn, 10 parts alfalfa meal, and 25 parts shorts	104 "
Lot 80, fed 85 parts corn, 10 parts alfalfa meal, and 5 parts bone meal	101.5 "

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Ranked according to economy of gain.

	Cost of 100 lbs. gain.
Lot 78, fed 90 parts corn and 10 parts alfalfa meal	$3 80
Lot 79, fed 85 parts corn, 10 parts alfalfa meal, and 5 parts tankage	4 12
Lot 77, fed 100 parts corn	4 42
Lot 80, fed 85 parts corn, 10 parts alfalfa meal, and 5 parts bone meal	4 72
Lot 81, fed 65 parts corn, 10 parts alfalfa meal, and 25 parts shorts	5 02

Ranked according to profit per pig.

	Profit per pig.
Lot 78, fed 90 parts corn and 10 parts alfalfa meal	$2 56
Lot 79, fed 85 parts corn, 10 parts alfalfa meal, and 5 parts tankage	2 26
Lot 77, fed 100 parts corn	2 03
Lot 80, fed 85 parts corn, 10 parts alfalfa meal, and 5 parts bone meal	1 20
Lot 81, fed 65 parts corn, 10 parts alfalfa meal, and 25 parts shorts	92

Lot 78, fed corn and alfalfa, ranked second in rapidity of gain and first in economy of gain and profit per pig. This ration evidently was the most satisfactory of any in this test.

Lot 79, fed 5 parts tankage with corn and alfalfa, made the most rapid gain and ranked next to a ration of corn and alfalfa in economy of gain and profit per hog.

Lot 77, fed corn alone, ranked third in the three points of comparison. It did not give as good results as alfalfa and corn, or as alfalfa, corn and tankage, but gave better results than a ration containing bone meal or shorts.

Lot 80, fed 5 parts bone meal with alfalfa and corn, gave more satisfactory results than the lot fed shorts with corn and alfalfa.

Lot 81, fed 65 parts corn, 10 parts alfalfa meal and 25 parts shorts, ranked fourth in rapidity of gain, and fifth in economy of gain and in profit per pig.

In this test the addition of digester tankage, bone meal or shorts to a ration of corn and alfalfa increased the cost of gains and lessened the profit per hog. The results are in accord with the results of former experiments where alfalfa formed a part of the ration. Under these conditions the addition of tankage has increased the gains, but also the cost of the gains, and has decreased the profit.

EXPERIMENT 26.

Comparison of corn, corn and alfalfa, and supplementary grains with corn and alfalfa.

During the winter of 1909 and 1910, from November 9 to February 25, 109 days, the following rations were fed to six lots of 10 pigs each:

Lot 58, 100 parts corn.
Lot 60, 90 parts corn and 10 parts chopped alfalfa.
Lot 82, 65 parts corn, 25 parts emmer, and 10 parts chopped alfalfa.
Lot 83, 65 parts corn, 25 parts barley, and 10 parts chopped alfalfa.
Lot 84, 65 parts corn, 25 parts wheat, and 10 parts chopped alfalfa.
Lot 85, 65 parts corn, 25 parts milo, and 10 parts chopped alfalfa.

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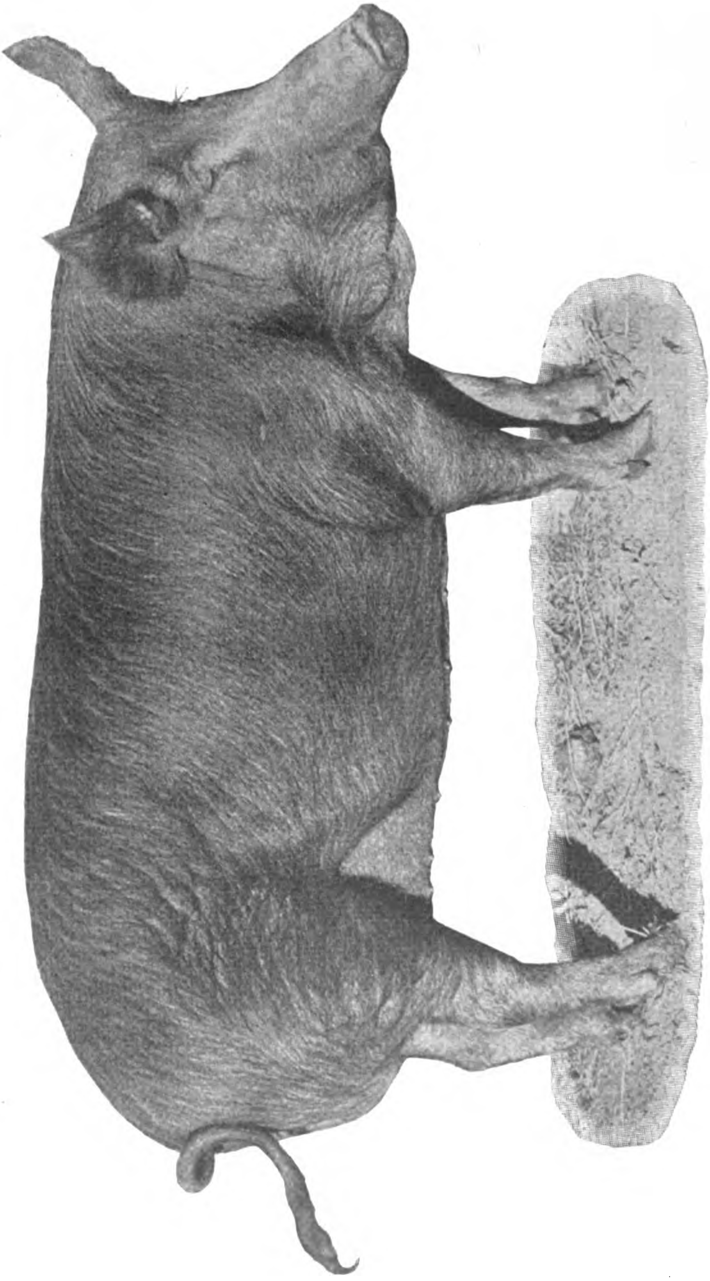

The Tamworth breeder's ideal yearling sow.

The average weight at the beginning of the experiment was about 90 pounds, and at the close of the experiment about 235 pounds. The grain was ground, mixed with the chopped alfalfa, and moistened in the trough. The relative results of these rations are given below, where each ration is ranked according to the gain produced by it, the cost of the gain, and the profit per hog during the experiment.

Ranked according to rapidity of gain.	Gain per pig.
Lot 84, fed 65 parts corn, 25 parts wheat, and 10 parts chopped alfalfa	144.6 lbs.
Lot 82, fed 65 parts corn, 25 parts emmer, and 10 parts chopped alfalfa	141.0 "
Lot 60, fed 90 parts corn and 10 parts chopped alfalfa	139.6 "
Lot 83, fed 65 parts corn, 25 parts barley, and 10 parts chopped alfalfa	133.0 "
Lot 85, fed 65 parts corn, 25 parts milo, and 10 parts chopped alfalfa	132.8 "
Lot 58, fed 100 parts corn	105.0 "

Ranked according to economy of gain.	Cost of 100 lbs. gain.
Lot 60, fed 90 parts corn and 10 parts chopped alfalfa	$3 96
Lot 82, fed 65 parts corn, 25 parts emmer, and 10 parts chopped alfalfa	3 97
Lot 83, fed 65 parts corn, 25 parts barley, and 10 parts chopped alfalfa	4 15
Lot 84, fed 65 parts corn, 25 parts wheat, and 10 parts chopped alfalfa	4 22
Lot 85, fed 65 parts corn, 25 parts milo, and 10 parts chopped alfalfa	4 39
Lot 58, fed 100 parts corn	4 46

Ranked according to profit per pig.	Profit per pig.
Lot 82, fed 65 parts corn, 25 parts emmer, and 10 parts chopped alfalfa	$2 72
Lot 60, fed 90 parts corn and 10 parts chopped alfalfa	2 65
Lot 84, fed 65 parts corn, 25 parts wheat, and 10 parts chopped alfalfa	2 43
Lot 83, fed 65 parts corn, 25 parts barley, and 10 parts chopped alfalfa	2 38
Lot 85, fed 65 parts corn, 25 parts milo, and 10 parts chopped alfalfa	2 01
Lot 58, fed 100 parts corn	1 51

Corn did not give as satisfactory results in this test as it has usually given. It ranked below all of the other rations in profit per pig and gain. However, the standard of comparison should be lot 60, fed 90 parts corn and 10 parts of chopped alfalfa, as all others were fed 10 parts chopped alfalfa. This ration was outranked by wheat and emmer in rapidity of gain and by emmer in the profit per pig, but produced the cheapest gain of any ration. Emmer made a much better showing in this test than in former tests. We do not think further tests will give it this high place. Many of the hulls were knocked off the emmer by the threshing machine. This may explain its high efficiency in this test. As usual, wheat produced fast gains but not cheap gains. Barley made a less favorable record than formerly in comparison with emmer. Milo and barley proved to be equal, pound for pound, in this test.

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If we assign to chopped alfalfa the price assumed for it in this bulletin, and to corn the price received for it in lot 60, which was 71 cents per bushel, we find that the following prices were received per bushel for supplementary grains: wheat 88 cents, barley 48 cents, milo 48 cents, and emmer 45 cents. With corn at 47 cents per bushel, the value per bushel of the other grains, for feeding as in this test, would be: wheat 58 cents, barley 46 cents, milo 46 cents, and emmer 30 cents.

The results of this one test are not conclusive, but the showing made by the supplementary grains does not indicate that these grains, when fed as in this experiment, are likely to give better results than corn and alfalfa.

EXPERIMENT 27.

The value of cane (sorghum) seed with alfalfa for fattening hogs.

The following rations were fed to four lots of 10 pigs each from November 8, 1910, to January 11, 1911, 63 days:

Lot 72, fed 100 parts corn.
Lot 73, fed 90 parts corn, and 10 parts chopped alfalfa.
Lot 86, fed 90 parts cane, and 10 parts chopped alfalfa.
Lot 87, fed 45 parts corn, 45 parts cane, and 10 parts chopped alfalfa.

The cane was composed chiefly of grains cracked by the thrashing machine. The feeding value was probably not as high as that of clean, plump seed, but it was probably as high as the feeding value of the average cane seed. All the grain was ground. The chopped alfalfa was mixed with the grain and moistened in the trough.

The average weight per hog at the beginning and end of the experiment, the gains, the feed required, and the cost of gains, were as follows: Cane is priced at 50 cents per bushel and corn at 47 cents per bushel:

TABLE 5. *Sorghum seed and alfalfa compared with corn and alfalfa for fattening hogs.*

RATION.	Average weight Nov. 8.	Average weight Jan. 11.	Average gain per pig.	Daily gain.	Feed* for 100 lbs. gain.	Cost of 100 lbs. gain.
	Lbs.	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	
Lot 72, corn	143	245	102	1.61	410	$3 45
Lot 73, corn and alfalfa	141	248	106	1.69	429	3 46
Lot 86, cane and alfalfa	140	212	72	1.15	608	5 78
Lot 87, corn, cane and alfalfa	139	229	90	1.43	492	4 30

* Grain and alfalfa.

In this experiment corn alone did exceptionally well in comparison with corn and alfalfa, probably because the pigs were large at the beginning. Cane and alfalfa, or cane, corn and alfalfa, did not give as favorable results as corn alone. However, the two lots fed cane and alfalfa should be compared with the lot fed corn and alfalfa. In comparing lot 73 and lot 86, we find that 1 pound of corn produced as much gain as 1.42 pounds of cane. With the corn there was not fed quite as much alfalfa as with the cane. Also, corn gave 1.47 times as much increase in weight as cane. Lot 73 gave a return value of 82 cents per bushel for the corn eaten, and lot 86 gave a return value of 50 cents per bushel for the

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cane eaten. If corn were worth 47 cents per bushel, cane would be worth 28.6 cents per bushel, according to the results given by lots 72 and 86.

Lot 87, fed half cane and half corn with 10 parts chopped alfalfa, gave better results than lot 86 fed 90 parts cane and 10 parts chopped alfalfa, but did not give nearly as good results as lot 73 fed 90 parts corn and 10 parts chopped alfalfa. If the pigs in lot 87 were charged 82 cents per bushel for corn it would return a value of 55 cents per bushel for the cane, or 5 cents per bushel more than where cane formed the entire grain ration. The results of feeding cane to these two lots would indicate that one bushel of corn was worth about as much as one and one-half bushels of cane for feeding hogs under the condition prevailing during this test.

TABLE 6. *The value of cane (sorghum) seed with alfalfa for fattening hogs, November 8, 1910, to January 11, 1911—63 days. There were 10 pigs in each lot.*

LOT NO.	72	73	86	87
RATION	Corn	90% corn 10% chopped alfalfa	90% cane 10% chopped alfalfa.	45% corn 45% cane 10% chopped alfalfa
Average first weight, lbs	143.5	141.5	140.0	139.5
Average last weight, lbs	245.5	248.0	212.5	229.5
Average gain per pig, lbs	102.0	106.5	72.5	90.0
Average daily gain per pig, lbs	1.61	1.69	1.15	1.43
Grain for 100 lbs. gain, lbs	410.0	386.0	548.0	442.0
Alfalfa for 100 lbs. gain, lbs	None	43.0	60.0	49.0
Total feed for 100 lbs. gain, lbs	410.0	429.0	608.0	491.0
Cost of feed for 100 lbs. gain, lbs	$3.45	$3.46	$5.78	$4.30
Profit on 100 lbs. gain, lbs	2.45	2.44	.12	1.60
Profit per pig	2.50	2.60	.09	1.44
Profit per pig daily	.04	.041	.001	.0023
Price received per bushel of grain	.80	.82	.50	.55*
Bushels grain for 100 lbs. gain	7.32	6.9	10.9	8.34
Average lbs. grain fed daily per 100 lbs. weight of pig	3.39	3.35	3.54	3.15
Average total feed fed daily per 100 lbs. weight of pig	3.39	3.72	3.93	3.87
Average total feed eaten per pig daily, lbs	6.60	7.25	6.99	7.15
Average mean weight per pig, lbs	194.5	194.7	177.7	184.5

*** 82 cents per bushel for corn and 55 cents per bushel for cane.**

EXPERIMENT 28.

Fattening hogs on corn and alfalfa pasture, April 25, 1908, to August 15, 1908.

There were three lots of 14 winter shoats each in this experiment. All lots ran in fields of alfalfa and were fed soaked corn. Lot 88 was fed out quickly on almost a full feed, lot 89 was fed out less quickly on a medium ration, and lot 90 was held for 11 weeks without grain and then given nearly a full feed. Each lot was kept until average weight per pig was 225 pounds.

Lot 88 was fed 2.91 pounds of corn daily per 100 pounds weight from April 25 to June 20. The average weight per pig on the former date was 148 pounds, and on the latter 225 pounds. The pigs were on feed 56 days. During this time they gained 77 pounds each, at the rate of 1.37 pounds daily. They required 392 pounds of corn per 100 pounds increase

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in weight. The grain for 100 pounds gain cost $3.29. These hogs returned a value of 84 cents per bushel for the corn eaten.

Lot 89 was fed 1.9 pounds of corn daily for each 100 pounds of their weight from April 25 to July 11. The average weight on April 25 was 147 pounds, and on July 11, 225 pounds. During these 11 weeks the gain per pig was 78 pounds. This was made at the rate of 1.02 pounds daily. These hogs ate 346.7 pounds of corn for each 100 pounds gain. The cost of the grain for 100 pounds of gain was $2.91. They returned a value of 95 cents for each bushel of corn eaten.

Lot 90 ran on alfalfa pasture without grain from April 25 to July 11, about 11 weeks. During that time the daily gain per hog was .52 pound. From July 11 to August 15 they were fed soaked corn. They were fed 3.1 pounds daily per 100 pounds of their weight. The daily gain per hog during this period of 5 weeks was 1.32 pounds. They required 407.2 pounds of corn for each 100 pounds gain. The cost of the grain used in producing 100 pounds gain was $3.42. During this short fattening period they required more grain for 100 pounds of gain than lot 88 under quite similar conditions.

If we compare the results of the three lots from the time the experiment began until the hogs in each lot had reached the average weight of 225 pounds we shall find that lot 88 reached this weight in 8 weeks, lot 89 in 11 weeks, and lot 90 in 16 weeks. The hogs fed the most grain daily per 100 pounds of their weight made the fastest gain but required more grain to produce 100 pounds of gain than the hogs fed less grain. The hogs fed less grain undoubtedly ate more alfalfa than the others. We presume that the cost of alfalfa pasture is not in excess of 25 cents per month for hogs not being fed grain, and for hogs being fed a full ration the cost would be not to exceed one-half of that amount. It seems fairly accurate to charge the hogs not being fed grain .8 of a cent per head daily for pasture, those being fed a medium grain ration .6 of a cent, and those being fed a full grain ration .4 of a cent. At this rate the charge per hog for pasture in this experiment should be 22.4 cents for lot 88, 45.6 cents for lot 89, and 74.8 cents for lot 90. After making this charge, the profit per hog in lot 88 is $1.78, in lot 89 $1.87, and in lot 90 $2.45. If we reduce the profit to a unit of one pig for one day, we find that the profit per pig daily in lot 88 was 3.18 cents, lot 89 2.46 cents, and lot 90 2.2 cents. Though the pigs in lot 90 gave the greatest profit, they did not give as great a profit in the same length of time as the pigs in the other lots. In this case, time represents interest on investment and risk on the stock. Which method of feeding will give the most satisfaction will depend on many variable conditions. Where alfalfa is abundant the results of this experiment indicate that a greater profit may be obtained by developing the hogs slowly on the alfalfa without grain, and then fattening them. On the other hand, if the owner can replace the hogs by others, then he can make a greater profit on the same investment in the same time by feeding grain.

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TABLE 7. *Fattening hogs on corn and alfalfa pasture, April 25, 1908, to August 15, 1908.*

Rations: Lot 88, 3 per cent soaked corn from April 25 to June 20.
Lot 89, 2 per cent soaked corn from April 25 to July 11.
Lot 90, no grain from April 25 to July 11. 3 per cent soaked corn from July 11 to August 15.

There were 14 pigs in each lot.

LOT NO.	88	89	90	90	90
	April 25 to June 20.	April 25 to July 11.	Period 1. April 25 to July 11.	Period 2. July 11 to August 15.	Period 3. April 25 to August 15.
Number days in period	56	76	76	35	111
Average first weight, lbs.	148	147	139	178.5	139
Average last weight, lbs.	225	225	178.5	225.0	225.0
Average gain per pig, lbs.	77	78	39.5	46.5	86
Average daily gain per pig, lbs.	1.37	1.02	.52	1.32	.77
Grain for 100 lbs. gain, lbs.	392	346.7	....	407.2	202.6
Cost of grain for 100 lbs. gain	$3.29	$2.92	....	$3.42	$1.70
Profit on 100 lbs. gain	2.61	2.99	....	2.48	4.20
Profit per pig	2.00	2.33	....	1.15	3.20
Profit per pig daily	.035	.03	....	.032	.028
Price received per bushel of grain	.84	.95	....	.80	1.63
Gain from 1 bushel corn, lbs.	11.41	12.26	....	13.77	27.7
Grain daily per pig, lbs.	3.43	3.55	....	5.4	1.7
Grain daily per 100 lbs. weight of pig, lbs	2.91	1.90	....	3.1	.92
Average mean weight per pig, lbs	186.5	186.0	....	174.0	182.0

Charging for alfalfa pasture gives the following:

Alfalfa pasture per pig daily, cts.	.4	.6	.8	.4	....
Cost of alfalfa pasture per hog, cents	22.4	45.6	60.8	14.0	74.8
Cost of alfalfa pasture and and grain for 100 lbs, of gain	$3.58	$3.49	$1.54	$3.72	$2.57
Profit per pig	1.78	1.87	....	....	2.45
Profit per pig daily, cts	3.18	2.46	....	....	2.2

EXPERIMENT 29.

Fattening old sows on alfalfa pasture and corn.

During the summer of 1906, 10 brood sows running on alfalfa pasture were fattened on a ration of 3 pounds of corn daily per 100 pounds weight of the sows. They were fed for 30 days. The average gain per sow daily was 2.83 pounds. They required 301 pounds, or 5.37 bushels, of corn for each 100 pounds of gain. The cost of grain for 100 pounds of gain was $2.53. This test was reported in Bulletin No. 99, page 21.

On July 13, 1908, 14 old sows, from which the pigs had been weaned, were put on a ration of 2 pounds of soaked corn daily per 100 pounds of their weight while running on a field of alfalfa. On July 18 their weight was taken and their ration increased to 3 pounds daily per 100 pounds of their weight. They were kept on this ration 31 days, or until August 18. Their weight on July 18 was 4160 pounds, or 297 pounds each, and on August 18, 5110 pounds, or 365 pounds each. The increase in weight was 850 pounds, or 60.7 pounds per head.

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They gained 1.96 pounds each daily. They ate 358 pounds of corn, or 6.37 bushels per 100 pounds of gain. The cost of grain for 100 pounds gain was $3. This left a profit of $2.90 on each 100 pounds of gain, not including the cost of the alfalfa pasture. This was a profit of 5.7 cents per head daily.

A record was kept of the weight of old sows as they were put into and taken out of an alfalfa field where they were being fattened in the summer of 1909. The sows were put into the field from June 25 to July 30 and taken out as they became ready for the market. They were fed 3 pounds of soaked corn daily per 100 pounds of their weight. The weight of the 22 sows put in was 6636 pounds. Their weight when taken out was 8660 pounds. The increase in weight was 2024 pounds. While making this gain they ate 6743 pounds of corn, or 6 bushels (334 pounds) of grain for 100 pounds of gain. The cost of corn for 100 pounds of gain was $2.81. The cost of the alfalfa pasture would have increased this, probably, to $3. These hogs returned 98 cents for each bushel of grain eaten, not counting the cost of alfalfa pasture. One bushel of corn produced 16.2 pounds of gain.

On August 17, 1910, 9 old sows weighing 2515 pounds, or 279 pounds each, were put in a field of alfalfa and fed 3 pounds of soaked corn per 100 pounds of their weight daily until September 19. On the latter date they weighed 3120 pounds, or 346 pounds each. The average daily gain was 2 pounds per head. During this time they ate 2640 pounds of corn and gained 605 pounds. They ate 7.6 bushels (430 pounds) of corn for each 100 pounds of gain. The cost of grain per 100 pounds gain was $3.61. This gave a daily profit per hog of 4.6 cents, not counting the cost of the pasture.

From the results of feeding old sows during four summers, we may safely conclude that mature sows fed on nearly a full ration of corn while on alfalfa pasture will gain approximately 2 pounds each daily and will make 100 pounds increase in weight from 6.33 bushels (355 pounds) of corn. The cost of the grain should be about $3 per 100 pounds of gain when corn is 47 cents per bushel. The sows should give a profit of 5.8 cents each per day when the cost of the alfalfa pasture is not considered, or from 5 to 5.5 cents profit per head daily after the cost of alfalfa pasture and grain has been deducted. This is considering hogs worth $5.90 per 100 pounds.

SUMMARY.

Part I.

The feeding of various proportions of alfalfa in a ration of corn, as alfalfa hay, as chopped hay, and as meal, indicates that the rations rank as follows, with the most satisfactory ration, viewed from the profit made per hog fattened, at the top of the list:

1, 100 parts corn and alfalfa hay in a rack.
2, 90 parts corn and 10 parts chopped alfalfa.
3, 90 parts corn and 10 parts alfalfa meal.
4, 100 parts corn alone.
5, 75 parts corn and 25 parts alfalfa meal.
6, 75 parts corn and 25 parts chopped alfalfa.
7, 50 parts corn and 50 parts chopped alfalfa.
8, 50 parts corn and 50 parts alfalfa meal.

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The first three rations stand closely together. Corn seems to have a stationary place between a ration of 10 parts alfalfa and 90 parts corn and a ration of 25 parts alfalfa and 75 parts corn.

Part II.

Of the many rations tried for fattening, none has been found the equal of corn and a small percentage of alfalfa.

Wheat gives faster gains with less grain per 100 pounds of gain than corn, but the high cost of wheat makes the gains from wheat more expensive than from corn. The profit per pig, if fed one-half wheat and one-half corn while being grown and fattened, is less than if fed corn. This is when both grains are fed with alfalfa. Experiment 23.

A ration of barley and corn with alfalfa does not give as fast gain or as much profit per hog during the growing and the fattening period as a ration of corn and alfalfa. Experiment 24.

The substitution of 5 parts tankage, 5 parts bone meal, or 25 parts shorts, for corn, in a ration containing 90 parts corn and 10 parts chopped alfalfa, increases the cost of gains and decreases the profit per pig during the fattening period. Experiment 25.

The substitution of 25 parts emmer, barley, wheat, or milo, for corn, in a ration containing 90 parts corn and 10 parts chopped alfalfa, increases the cost of gains and decreases the profit per hog during the fattening period, excepting emmer, which in this test only increased the profit per hog. The wheat increased the gains but decreased the profit. The emmer also increased the gain. Barley and milo decreased the gain as well as the profit. Milo was worth the same price per bushel as barley in this test. Experiment 26.

The result of one test indicated that a bushel of corn was worth as much as a bushel and a half of cane seed when fed with alfalfa for fattening hogs. Experiment 27.

Where fall pigs were wintered and turned on alfalfa pasture in the spring, there was more profit per pig from those grown out largely on pasture and then fattened than from those fed out more quickly. Experiment 28.

Four seasons' records show that old sows being fattened on corn and alfalfa pasture gained 2 pounds per head daily, ate 355 pounds of corn for 100 pounds of gain, and gave a net profit of over 5 cents each daily. Experiment 29.

A summary of the results recorded in Belletin 121 together with data from this bulletin indicates that the cost of feed to produce a 225-pound market hog was $3.25 per 100 pounds, and that keeping the hog until it weighed 325 pounds increased the cost to $3.57 per 100 pounds. This includes only the cost of feed and does not include the cost of labor, equipment, unusual risk, or interest on investment.

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CONCRETE FLOORS FOR HOG HOUSES.

From the *Stockman and Farmer.*

Some practical suggestions relating to concrete floors for hog houses are given by a Missouri subscriber in the following communication:

"We do not particularly object to cement hog floors, since it is easier to keep them clean and sanitary than any other kind, but there are several points to be given special attention in building and managing them. Properly built and handled, they are apt to prove the best made; but if incorrectly built or poorly managed they will give unsatisfactory results in most cases.

"In building a cement hog floor, care should be taken that it is not where the rain or snow will drift in on it and leave it damp, especially if it is to be the sleeping quarters of the herd, as a damp cement floor is even more detrimental than one of boards or earth, and is sure to result in serious injury to the hogs that sleep in nesting on it, rheumatism being one of the principal ailments resulting from such practice.

"Again, whether you think there is any liability of dampness creeping into such a floor or not, it should be slightly higher at one side, to insure proper drainage in case it is needed. Also, one is apt to make use of such floors for feeding places at some time or other, so they should be provided with shallow grooves for holding 2 x 4 timbers in place to keep the feed from being pushed off onto the ground, and so that any soiled bedding can be removed easily, or cobs and other refuse can be raked from it when used as a feed floor.

"Cement floors should be used only for feeding and sleeping purposes. If hogs are closely confined on them, bone and muscle ailments are sure to follow among the animals. Where brood sows are placed in buildings provided with these floors, they should be covered to a good depth with clean straw or litter, to relieve the hard walking. At the time of farrowing, another point must be given special attention. The sow is sure to carry all the bedding on the floor to one corner of the house, unless some precaution is taken to prevent it. With a part of the cold floor left bare of bedding, when the pigs are born, it seems an inborn characteristic of the little wrigglers to struggle around and get in some cold corner where there is no bedding. Here they soon chill to death.

"To avoid these losses, a light board rack or frame should be constructed to fit inside the cement floor. This will prevent the bedding from being scattered and a part of the floor left bare, in which case the pigs are not apt to wriggle very far away, and if they do they will not come in direct contact with the cold cement floor. Wire netting or common hog wire is also suitable for forming one of these protectors, and as they are easily moved or cleaned off they may prove even more satisfactory than the wooden frame. With one or the other of these, and not an oversupply of bedding to endanger the pigs by smothering, the loss of pigs at farrowing time is likely to be kept below the average; then, by giving the litter good range that will not confine them to the firm, unresisting cement floor, any dangers that might arise from that source will be averted."

There is no question but what the concrete floor is superior to all other types of flooring used, in permanent hog houses. There are objections to it, it is true, but these may in a large measure be overcome by giving attention to a few details such as are suggested by this subscriber. Too much emphasis can not be placed on the importance of good drainage, and under no circumstances should a concrete floor be made on the level with the surrounding ground unless it is placed on porous material and in turn some form of underdrainage provided. By using a small platform, say six feet square, in each pen at farrowing time, the danger of getting the little fellows chilled is entirely removed.

PRESENT AND FUTURE OF SERUM TREATMENT FOR PREVENTION OF HOG CHOLERA.

By F. S. SCHOENLEBER, V. S., State Agricultural College, Manhattan, at the Board's fortieth annual meeting.

The state of Kansas is primarily a live-stock state, the present value of her live stock being estimated at over $200,000,000. During the last twelve months she has lost through the ravages of disease, several millions of dollars' worth of domestic animals, many of these from preventable troubles. For investigating the causes and methods of treating these diseases there is directly available from the state not one single dollar.

If the state were to appropriate merely one penny for each animal lost from disease toward equipping and operating a laboratory for investigating outbreaks of an infectious nature, millions of dollars could be saved in a few years.

Opportunities for investigating certain diseases in the human family have been much greater than in the lower animals, and as a consequence principles followed in treating many diseases of domestic animals have been based to a great extent upon the results obtained in the laboratory of human pathology. We frequently hear the expression that certain persons have had the measles, the whooping cough or scarlet fever, intimitating that having had this particular disease, there is no further danger of having it the second time. It might be well also to recall the fact that these expressions are used commonly only in connection with infectious diseases. There is much truth in these statements, as usually one attack of an infectious disease immunizes against all future attacks of that same disease, no matter how light the attack may have been. In smallpox, for example, before the discovery of vaccination, the disease frequently devastated all Europe. In the absence of vaccination, it has been one of the most virulent and widespread of the infectious diseases. To-day an outbreak of smallpox in the state of Kansas is little more to be dreaded than an outbreak of measles. Who can not say that repeated vaccinating and inheritance do not play a very important part in obtaining such a condition. This same process will probably in time give similar results in other infectious diseases, whether they are in the human or in the lower animals.

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To-day we successfully vaccinate against typhoid fever in the human patient, and treat diphtheria with serum. In the lower animals we are making great progress in vaccinating against many of the infectious diseases, also treating many with serum. In each particular case the vaccine used is a specially prepared material effective only against that one particular disease. Some of these vaccines aid in curing, others are used only as a preventive.

In handling all infectious diseases, we recognize primarily a few fundamental principles upon which much of the success of the treatment depends, among which the following play an important role: Native susceptibility of the subject conduces to disease. This native susceptibility, or natural susceptibility, varies greatly in different classes of animals and also in different individuals of the same species. So far as we are able to judge, however, it reaches its highest point in the porcine family—the hog. It may be either congenital or acquired. If acquired, it is frequently through debilitating disease, unsanitary surroundings, lack of care, improper feeding, parasites, exposure, in fact anything that may have a tendency to reduce the vitality of the individual. Again, if the virulence of the invading infection is weak and the resistance of the protective elements of the animal are potent or active, the animal we say is to that extent immune to disease. This will to a certain extent explain why an outbreak of a certain infectious disease may be acute and severe in certain localities, while in others it may be mild and run a long chronic course. Certain seasons of the year and also in certain years these outbreaks may be more severe than in others. Another feature which we find prominently manifested is that other things being equal an attack of an infectious disease is violent in ratio with the size of the dose of the infection. All of these principles are, however, very intimately interwoven; for example, diphtheria germs are constantly in the air during epidemics of that disease, so proved by the fact that the bacilli have been often obtained from healthy throats. Not having any definite way of knowing which of the above features is responsible, we can many times only ask—while we can not conclude which one is probably responsible for the fact that a person does not succumb to a disease—Is the native susceptibility of that person so great or the dose of the infection so small, or is the virulence of that invading organism so weak or the resistance of the protective elements of the person so potent, that causes that person to be immune to that particular disease? Ordinarily these questions remain unanswered. It is thus seen that we have several avenues through which it is possible to attack an organism, if such it be, in combating an infectious disease. It has been found that some diseases can be more readily controlled in one way while others require an entirely different mode of procedure, and no mathematician can figure this out, nothing short of actual trial of the different methods.

From the fact that one attack of an infectious disease usually immunizes, some diseases are attacked or forestalled by reducing in the laboratory the virulence of the organism and injecting that organism, together with its products in a certain strength and in a certain sized dose into the person or animal to be immunized. Other diseases are attacked from a different vantage point, merely the size of the dose of the

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infection. The size of the dose and the strength of the virus in all cases are established in the laboratory and by experiment.

The most scientific method, however, where it can be applied, is to raise the resistance of the protective elements of the individual to so potent a point that it immunizes that individual against the most virulent form of the disease, and against any amount of infection.

The principles involved in the last method are the ones employed today in immunizing hogs against the cholera. The administration of the anti-hog-cholera serum raises the protective elements to a point where the system resists the invasion or the establishing itself of the disease-producing organism. The serum supplies the extra amount, and raises the resistance of the protective elements to a point necessary to accomplish these results.

Inasmuch as this material is of a nature to raise the resisting power of the hog against the disease, and contains no disease-producing virus, it follows that this serum can not under any circumstances *produce* the disease. It is further seen that the size of the dose received by an animal must be in ratio with the size of the dose of the infection and the virulence of the virus; in other words, if the amount of serum received by the animal is too small for the size of the dose of infection or the virulence of the virus, vaccination will not protect. It is readily seen that the size of the dose of protective serum administered must have some basis, and the only way to arrive at any practical conclusion is by way of experiments. Even after arriving at the average practical dose it is always well to add a large percentage of human brains and as much experience as possible with each dose administered.

The permanency of this artificial immunity varies in different individuals. In the case of vaccination against hog cholera with the anti-hog-cholera serum, this immunity seems to last a variable time, from possibly six weeks to six months, sometimes ever for life. In the majority of cases, however, it lasts from three to six months. Further experimentation is regard to the size of the dose and frequency of its administration, especially in young pigs and sick animals, is necessary.

The present status of the serum treatment for the prevention of hog cholera may be summed up from our experience during the past year as follows:

1. Sterile, potent serum properly administered in the proper sized doses will absolutely protect a hog against cholera.

2. The serum will protect against hog cholera only. If the animal has some other disease, and not cholera, it will do no good.

3. When a hog has the disease or has been exposed to the infection, if an amount of serum sufficiently large can be given to raise the resisting powers to a degree high enough to overcome the effects of the virus in the system, the hog gets well.

It follows then that the most important element next to the serum is time—the sooner the animal is vaccinated after being exposed or infected, the greater the chances of recovery.

4. In infected herds, the losses after vaccination have averaged about fifteen per cent; in the great majority of herds, less than two per cent. About ten per cent of this loss is directly traceable to several features—

vaccination too long delayed; unsanitary surroundings; lack of proper care immediately before or after vaccinating.

The future outlook of the serum treatment is optimistic and will depend entirely upon the people. While it seems necessary to experiment along several different lines before perfection is reached, it is at present doing good work. Hog cholera can be eradicated via the serum treatment method if properly handled. If we would eradicate the disease from the state, we must remedy two things; first we must make more serum; second, its administration must be simplified. It is absolutely certain that if we would stamp out any infectious disease from a district, state or section of country, the work must be systematically and scientifically done. No sporadic, incidental or amateur methods will avail. Disease or death know no "red tape" or politics, and the sooner these are divorced and the proper laws enacted and fearlessly and firmly enforced, the sooner will the desired results be realized. If ever civil service is needed it is in dealing with diseases, either human or in our domestic animals.

DISCUSSION.

H. W. AVERY: Is it the intention to furnish this serum free to the people of the state, or charge for it?

DR. SCHOENLEBER: I would not be in favor of furnishing free serum. I would furnish free administration of that serum, however. Why not in favor of free serum? For this reason: Time and time again we have received telegrams to hold a post mortem on a pig, or "I have some trouble with my hogs." If this serum was free we would absolutely not be able, with ten different plants, to supply all that would be asked for. There must be a line drawn somewhere, and a great many people would think their hogs had cholera, when in reality they did not, when they died from other ailments. We have experienced that, and then they would believe that the state authorities were not giving them a square deal in not treating their animals, when they did not have the cholera or any signs of it. I would be in favor, however, of charging the exact cost of the serum, otherwise the work to be done free. In the holding of post mortems and finding out what the trouble is, as I mentioned, if the cholera is not there, the serum will do no good. In fact, it might do harm because if there is a certain amount of inflammation or disease present in an animal, if it is dying, the natural susceptibility or the vitality of that animal is reduced. If you inject more serum you are going to reduce it still more, and that accounts for troubles we are having in some herds. We get reports that the hogs are dying faster than before they were vaccinated. Why? Because of the fact that they have a certain amount of infection present in their systems at that time, and if you add a little serum, that naturally will cause a reaction on the animal, his vitality is still further reduced and he succumbs to the disease.

THOS. M. POTTER: Would you give us the process?

DR. SCHOENLEBER: The method of preparing the serum is a more or less lengthy one. We are using the short cuts so far as time is concerned. The way we do it at the plant, we first vaccinate the animals that we expect to draw the serum from. We give them a dose of this serum at the same time we give them some diseased blood. Now, that

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virtually gives this animal a light attack of the disease, a very light attack. As I mentioned in the paper, that animal has had an attack of that disease, therefore it is immune to a second attack, but that will not do. We must then, after the animal is immunized, give him a certain amount of diseased blood, or cholera or virulent blood, as we call it, blood which has been taken from an animal just about ready to die from cholera. We give each one we expect to try about five cubic centimeters per pound of his weight. We inject that into the ear vein of the animal, about a quart into hogs neighboring say two hundred pounds. That takes a little skill. This hog sometimes has a little fever as a result of all this diseased blood in there, but after a certain length of time he overcomes that and his system is what we call hyper-immune. His system is in such a condition that no matter how much diseased blood we inject we can not kill him. We draw this blood from the tail of the animal and we defibrinate that. In reality it is not serum, but it is defibrinated blood.

H. W. **AVERY**: Do you use any other animal besides the hog in preparing this serum?

DR. SCHOENLEBER: Up to date we have not found any other suitable animal. There have been experiments made time and again.

J. T. **TREDWAY**: Can you or do you send the serum directly to farmers upon application?

DR. SCHOENLEBER: We can not do that. We are trying to be law abiding citizens up at the Agricultural College, and the law reads differently. At the time the present laws were enacted, laws which relate to diseases of animals, we did not pretend to treat hog cholera. As a consequence, we find now that these laws are inadequate. There is too much time consumed between the hog raiser starting in his order for serum and the time the serum gets to his place. The method now employed is that a farmer telephones in that he wants the serum. We tell him he must go to the live-stock sanitary commissioner, at Topeka, who will communicate with us and we will bill the order as soon as we have the serum, and in that way of course he does not get it from us direct.

J. T. **TREDWAY**: Would you advise an amendment to the present law?

DR. SCHOENLEBER: As an officer of the institution I might not, but as a private citizen and a hog raiser I certainly should.

PRESIDENT SUTTON: How about the approximate cost?

DR. SCHOENLEBER: When we started the serum plant a long time ago we found that hogs were not selling as high as they are selling to-day. We established a price of one and one-half cent per cubic centimeter, which means thirty cents per dose for a 100 pound pig or less, sixty cents for a pig weighing between 100 and 200 pounds, and ninety cents for all over that weight. That is the maximum dose so far. We are now adhering to these amounts and these rules for the reason that we have not had the opportunity or the money with which to experiment further. I believe that we can make a little difference in these doses and I believe that we can save some of these animals that are sicker than the ones that we are saving now, if we would try, not one dose, but two doses or more; that is, at variable intervals of time. As said, the vitality of the hog is low. Now, if we give the animals a dose large

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enough to overcome that whole disease at that one particular time, it may overcome the vitality of the animal and it may die, while if we gave a smaller dose, and a few days later another, it might be just the thing. The cost of this at the present time I believe is a little over one and one-half cent per cubic centimeter.

H. W. Avery: You charge enough to cover all?

Dr. Schoenleber: That is the charge that has been established.

Jas. Haston: I would like to ask if it would not be better if this law was changed so that we could get immediate service.

Dr. Schoenleber: Yes, and be better for the hogs, too. The question of time is second only to the serum.

Secretary Coburn: I do not understand whether this serum can be administered except by a veterinarian. Is the ordinary farmer capable of using it?

Dr. Schoenleber: No, for several reasons. In the first place, we might find that nine people out of ten could administer it and would administer it successfully, and the tenth might lose enough animals to pay for all of the work that is done by these other parties; that is, to pay a veterinarian to do all the work.

Secretary Coburn: If I understand you correctly, all this serum sent out is administered under the supervision of veterinarians?

Dr. Schoenleber: Yes, sir; in order to insure the reputation of the serum we have been very particular on that point on account of establishing the value of the serum.

Secretary Coburn: Suppose a farmer in Stevens or Cheyenne county has a herd of hogs believed by him to be afflicted. Do you send a man to him with this remedy?

Dr. Schoenleber: Yes, sir, on orders from the live-stock sanitary commissioner. We do not go on calls from anyone else. There is a point there that should receive attention also. If we could get a man from that particular place, wherever that may be, able to administer the serum it might be all right, if it were on the main line of a railroad, to send him the serum by express, but we had cases in which we sent serum a short distance, comparatively, and it took four days for it to arrive. We have sent some by express to Concordia, for instance, from Manhattan, which arrived frozen, with the bottles broken. We did not care so much about the cost of the serum, because the express company would pay that, but we needed the serum. It was worth a great deal more than the actual cost. Sending by express is not the proper thing to do, unless on the direct line, if it can be gotten there some other way better and quicker. Another feature in sending by express: There is a peculiar condition which is necessary to preserve that serum; several things that are necessary. The most important is the temperature at which this serum should be kept. The Bureau of Animal Industry has experimented along that line quite a little. The serum will keep best, according to their experiments, at a temperature of about fifty degrees Fahrenheit. They have sent serum to one of the western states, which proved no good. They went out with some serum of that same batch that was all right, and finally they decided that if you take this serum and warm it up, cool it down, warm it up again, and cool it down, it gradually

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loses its virulence. That is a question we must, for the reputation of everybody concerned, and the good of the hog, be careful about. The temperature should be kept as near fifty degrees as possible in order to preserve potency.

SECRETARY COBURN: Suppose a man in a remote county found a violent outbreak of cholera in his herd: Might he not lose his entire herd through these roundabout and indirect methods of getting the serum to him?

DR. SCHOENLEBER: It has actually occurred.

SECRETARY COBURN: The live-stock sanitary commissioner might be out of town on some other business and not know of this request for a week or ten days, and all that time might be lost, might it not, by your present way of doing business?

DR. SCHOENLEBER: I told you we tried to be law-abiding citizens, but there were several instances in which we did not live up to the law. A man telephoned to me one Saturday evening, for instance, from Axtell, that he had cholera in his herd and wanted some one to vaccinate them. I told him he would have to go through the live-stock sanitary commissioner's office, and he said, "I have tried to get him and could not." I said, "I do not know what you can do." He said, "Can't you send up a man with serum to vaccinate? I will pay the expenses. I probably would not be able to get action before Monday or Tuesday, and then the hogs will be dead." So I got busy and sent him a man; got him up there Sunday, and he vaccinated, and the man claims that we saved his hogs. Such things are apt to occur, and do occur. This I mention as an example. We have about a thousand to two thousand doses of serum per week now. Usually it takes from four to six days between the times we are ready to send out the serum. We have 1500 to 2500 doses at each time. It takes that long to produce it, and it takes about an hour and a half to send that out, and all the rest of the time with orders for three, four, and sometimes five times that much, waiting. These people are losing their hogs. We frequently get returns canceling the order—no hogs left.

H. W. AVERY: Does that mean you get more cholera right along? In other words, if this is going to keep up right along it would lead me to believe you are getting more cholera in spite of the treatment.

DR. SCHOENLEBER: I believe we are, for this reason: We find outbreaks in different parts of the state are all spreading. Why? Because we have not serum enough to go around. It would seem to me, as a private citizen, as a hog raiser, that a plan might be evolved which would work somewhat upon this idea: We know that we cannot now produce enough serum within the next six months to stamp out the cholera of the state; it has spread too far. We have an epidemic almost over the whole state. But we expect that the regular disease will occur along in the spring and summer. The idea is that if we can continue to produce and store serum, after the cholera dies down, until isolated cases begin breaking out again, then have them reported, and a man goes down and vaccinates that herd, to disinfect, to quarantine, to vaccinate all the healthy animals around that herd in order to prevent the disease in each and every outbreak, I believe that it can, to a great extent, be controlled.

H. W. **Avery**: How long will this serum keep?

Dr. Schoenleber: At a temperature of 50 degrees it will keep several years, according to the experiments of the government; but of course we have never had occasion to test that. We have had to use the serum right away.

Secretary Coburn: Do you figure that at the present time your enterprise has been worth all it cost?

Dr. Schoenleber: I figure that we have spent in the neighborhood of five or ten thousand dollars, and that we have saved, directly and indirectly, anywhere between fifty and one hundred thousand dollars' worth of hogs, possibly more.

H. W. **Avery**: Do you mean that much state money, besides that of individuals?

Dr. Schoenleber: Yes, sir.

Secretary Coburn: Hasn't the government put a lot of money into this undertaking, too, at Manhattan?

Dr. Schoenleber: Every single dollar that has been put in, excepting what has been paid in for serum sold, has been turned over to the Agricultural College, which funds were appropriated to something else. The government has absolutely nothing to do with it.

Secretary Coburn: Doesn't the government also keep a high-salaried man at the college?

Dr. Schoenleber: It does. That has nothing to do with the serum.

Secretary Coburn: What does he do?

Dr. Schoenleber: It might be well to bring in a little history right here. I believe in June, 1909, the Bureau of Animal Industry wrote to the veterinarians of the most important hog-producing states stating that they had been working upon and had produced a serum for the protection of hogs against the cholera, and that there would be a demonstrator of it at Ames, Iowa, I believe on June 15, 1907 or 1908. Mr. Burkett was then director of our station; and I went to that conference. The idea of the government was then to have these men pass upon whether or not this serum was what they thought—a prevention of hog cholera. We went through the whole process up there for about ten days or two weeks, looked into everything, and then decided that it would prevent cholera. I came back and brought the matter before the board of regents at every meeting—I do not know how many times—and finally got tired and said I was tempted to go into it myself, as a private venture, because I thought the people of Kansas had a right to have the benefit of that serum. A member of the board said it was a college proposition. Nothing was done until President Waters came there, and about the first thing he asked me was, "What are you doing with this hog-cholera serum?" I told him, "Nothing." He was astonished. He said, "Why not?" I told him. He said, "You get busy and start that right now, if it breaks up the institution"; and we began to get busy as well as we could. He called us down time and again for using so much expensive expert labor there; but when I explained to him that it was a proposition which needed exact work, that a man could not learn all of the little, fine points in a short time, and that the main thing was to establish the reputation of the serum so that we knew that every drop that went out was good and would do its work, he was satisfied. We have passed that stage, and we have a man or two now who can do a whole lot of work, and about twice as much as they could earlier, and as well. They have gotten onto the ropes and know how.

H. M. CASEBEER: I would like to know what the specific nature of this hog disease is, whether it is animalcule, germicidal, or what it is; and, also, if it is germicidal, if the remedy is germicidal?

DR. SCHOENLEBER: The government says that the disease is caused by an ultramicroscopic organism. That is, that it is an organism which we can not see through the microscope. I have never seen it. That is what they say about it, and, being caused by that, it was upon that fundamental principle that they started in with the serum treatment, being an infectious disease. The serum itself is the defibrinated blood, with a very small amount of carbolic acid added to it to prevent the action of other organisms which might gain entrance to that defibrinated blood.

H. W. AVERY: Have you experimented with the horse or any other animal?

DR. SCHOENLEBER: The veterinary department has not.

H. W. AVERY: Has the college department, in any way?

DR. SCHOENLEBER: The bacteriology department some years ago did experiment along that line, for this reason: They had an idea that we could cheapen the production of this serum by using the serum from the horse in place of the hog, but they have now abandoned the proposition and have come to no definite conclusion.

H. W. AVERY: Do you know anything about the results of the use of that serum?

DR. SCHOENLEBER: Only by hearsay; that the serum was tried in several different herds, and for the reason that this native susceptibility of these particular animals I spoke of on which this serum was tried proved to be low, they contracted the disease. It did not prove successful.

H. W. AVERY: They contracted it from the use of the serum?

DR. SCHOENLEBER.: I suppose so.

H. W. AVERY: Is there any other infectious disease that is often mistaken for hog cholera that this serum would not affect?

DR. SCHOENLEBER: The anti-hog-cholera serum will absolutely not do any good in any disease excepting hog cholera.

H. W. AVERY: Is there such a disease that is often mistaken for hog cholera?

DR. SCHOENLEBER: Yes; there is pneumonia in the hog—an infectious trouble it turns out to be sometimes. There are a great many others; for instance, worms, which cause symptoms very similar to cholera. There are a dozen or more diseases which in many instances or stages resemble some symptoms of cholera, which, of course, are not cholera, and therefore the serum would do no good, but might do harm, for the reason that injecting the serum naturally causes a little reaction, and if the system is weak the animal will die.

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H. W. Avery: Is there any danger of the serum producing cholera?

Dr. Schoenleber: It cannot produce cholera, because there is nothing there to produce it with.

John Peck: Are any of these other diseases you speak of contagious from one to another?

Dr. Schoenleber: Infectious pneumonia is one, and, of course, worms, which are parasites.

Andrew Shearer: This is a very important subject. The professor will remember having correspondence with people at Frankfort in regard to this. I want to ask: What is there to prevent you from teaching the farmer boys to administer the serum, in your short course in college? I saw a serum administered to my horse. It is an exceedingly simple proposition. I could do it as well as a veterinarian, and he was a good one; there is no mystery. It is a simple process.

Dr. Schoenleber: Time and again we have found that abscesses would form at the point of the injection of this material. We have found time and again that the amount of serum administered was just a little too large for the vitality of that animal, and it takes just so much experience to get hold of all these little points. As I said before, probably nine men out of ten could, but the tenth would probably do enough damage to pay for the administering of all. Besides, it would not be the proper thing for the reputation of the Agricultural College.

SOME RESULTS OF COW TESTING.

From Nebraska Experiment Station Bulletin No. 129,
by A. L. Haecker and J. H. Frandsen.

The farmers of Nebraska are at present milking in the neighborhood of 700,000 cows, which produce on an average 125 pounds of butter fat per year. The fact that the productive capacity of the average Nebraska cow is so low necessarily means that there must be many cows in the state yielding not to exceed 80 to 100 pounds of butter fat per cow.

The Holstein cow Roxanna, owned by the University of Nebraska, has a record of 757 pounds of butter fat; the little Jersey Jacoba Irene, once owned by one of our Nebraska dairymen, produced 952 pounds; while the wonderful Guernsey heifer Dolly Dimple of Massachusetts has 906 pounds of butter fat marked to her credit when only three years old. It is hard to realize that some Nebraska farmers are working away with cows producing only 80 to 100 pounds of butter fat per year, while others, because they paid attention to some of the details, have cows producing four or five times this amount. There is no question but that at least 200,000 cows in Nebraska to-day are not paying for their keep, and that the profit of the other 500,000 can be greatly increased, if not doubled, by proper methods of feeding and management. There is hardly a question but that the production per cow can be increased from an average annual production of 125 pounds to 250 pounds of butter fat per year, thus adding millions of dollars to the income of the cow owners of our state.

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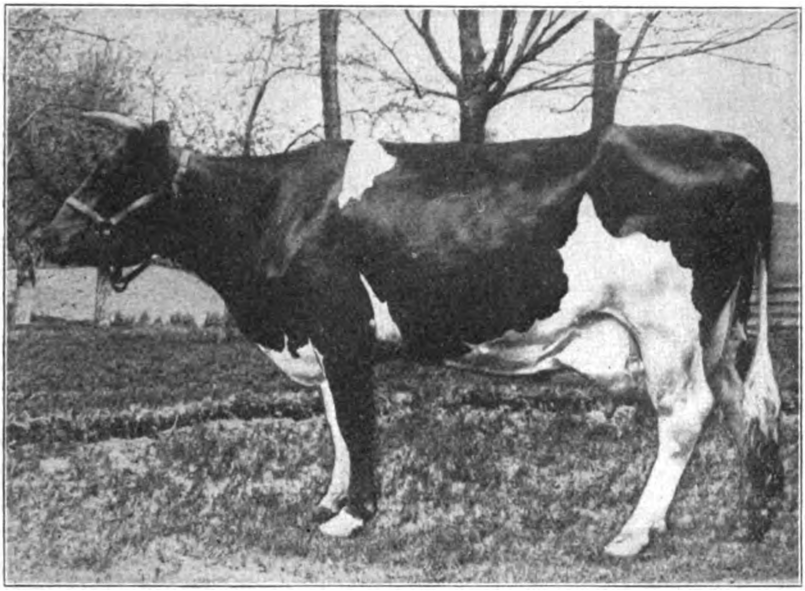
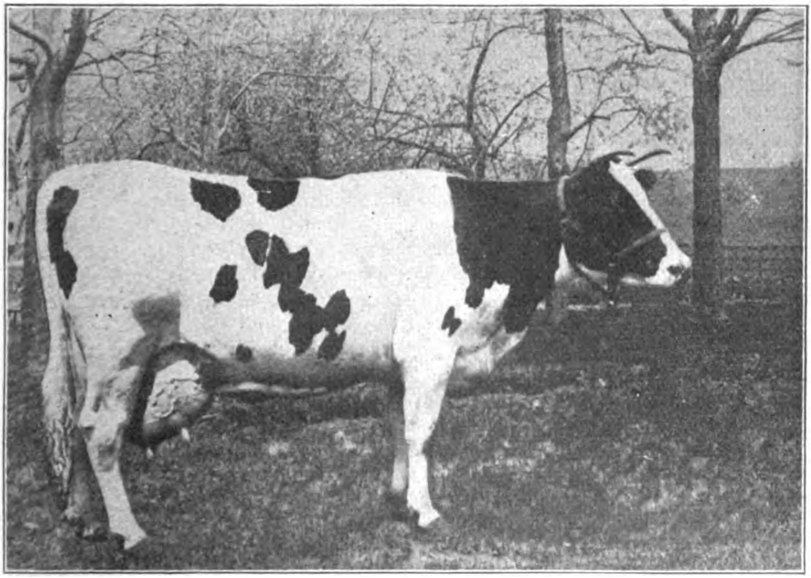


Five-year-old Holstein-Friesian cow Banostine Belle De Kol. Yielded in 365 days 27,404.4 pounds of 3.87 milk, containing 1058.34 pounds of butter fat, equal to 1322 pounds of butter—the world's one-year record for fat and butter.



Holstein-Friesian cow Daisy Grace De Kol. Yielded as a four-year-old 21.718.3 pounds of milk, containing 962.75 pounds of butter fat.

Now if such remarkable results can be accomplished by work of this kind, it seems hard to understand just why so many farmers have been slow to adopt a system of keeping records and testing the milk sufficiently often to enable them to discover and weed out of their herds the cow that generally consumes about as much feed as any cow in the herd, but produces only enough butter fat to pay for a fraction of the feed consumed. It is not necessary, nor even desirable, that the farmer should replace all of his grade cows with high-priced, pure-bred Holsteins, Jerseys, Guernseys, or Ayrshires. However, for successful and profitable dairying it is absolutely necessary that he realize the remarkable difference in productive capacity of the individual cows in the same herd, though these cows are cared for by the same man and are consuming practically the same amount of feed.

The good cow judge can generally tell the difference between cows of high and low productive capacity, but very few judges, if any, can always tell by type or conformation the cow producing 300 pounds of butter fat from the one producing only 200 pounds. As a matter of fact, the only accurate way of discovering the unprofitable cow is with the scale and Babcock test. The truthfulness of this statement has been brought out in many instances. The former owner of Jacoba Irene, keeping no records of her production, considered her only an ordinary cow and sold her for an ordinary price. Her worth was only determined after her owner took steps to have her tested. These figures revealed the remarkable fact that in less than a year she produced 1111 pounds of butter, or more butter than is being produced by seven average Nebraska cows.

Just west of Omaha, in Douglas county, is located a very prosperous, progressive farming community. Here the price of farm land is already in the neighborhood of $200 per acre. In this locality and in this connection it is of interest to note that even the farmer, who years ago could not be forced into dairying, has now turned to it and is getting very satisfactory results. These farmers fully realized the importance of keeping accurate records of the amount of milk and fat produced by each cow in the herd. They also realized that through a coöperative cow-testing association the expense of obtaining these records would be very materially reduced.

Through the efforts of Prof. E. M. Little, then manager of the Friesland Farms in Douglas county, and of Prof. A. L. Haecker, then Professor of Dairy Husbandry at the State University, the Douglas County Cow-testing Association was organized. The actual testing and keeping of records was started by J. W. Dawson and completed by W. C. Andreas. The members of this association entered 21 herds, comprising some 435 cows. The work of the tester consisted in keeping accurate records of the amount of milk and butter fat produced by every cow in the various herds, and also in making careful estimates of the feed consumed by these cows. To do so he had to spend one day each month with every herd belonging to the association. In addition to this work, this man was ever ready with suggestions as to how the rations could be improved for economical milk and butter-fat production.

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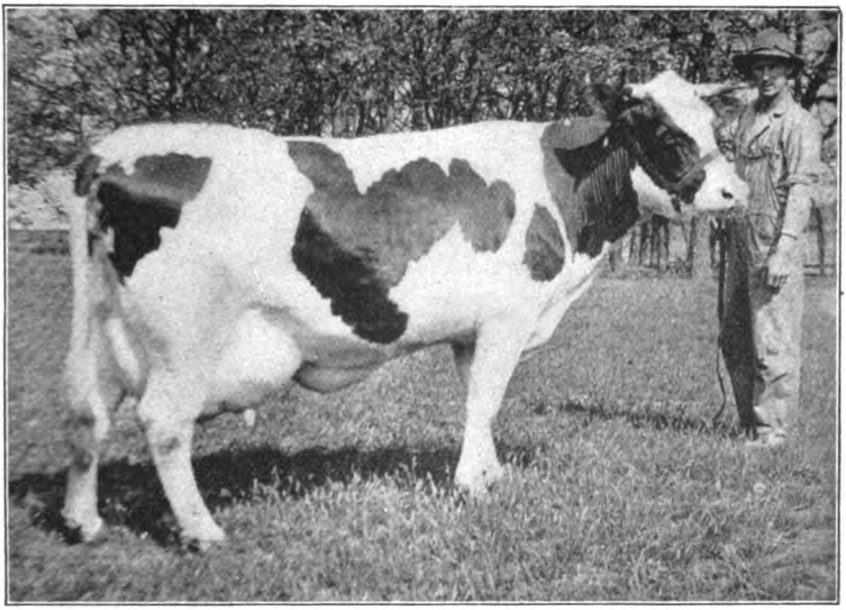
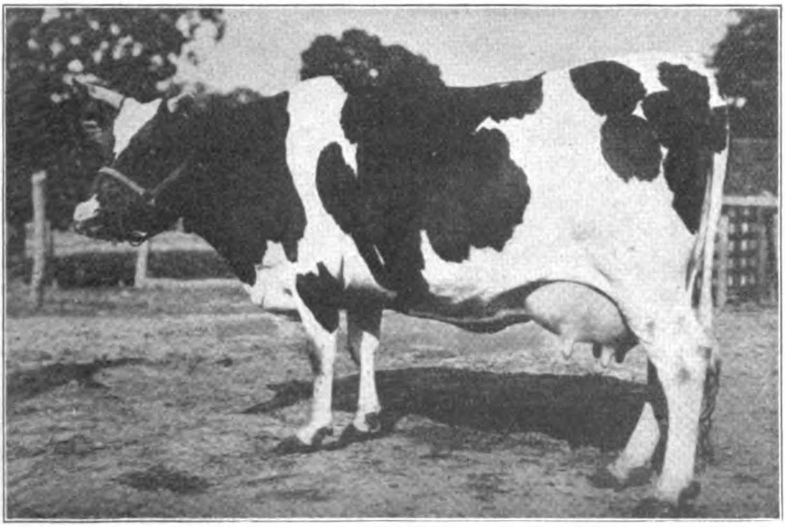


Holstein-Friesian cow, Miss Korndyke Hengerveld Ormsby, 108207, that when three years and seven months old had a seven-day record of 24.42 pounds of butter, with a milk test of 5.35 per cent butter fat.



Holstein-Friesian cow High-Lawn Hartog De Kol. Yielded in 365 days 25,592.5 pounds of milk, containing 998.34 pounds of butter fat.

TABLE 1. *Comparison of best and poorest cows.*

Herd No.	NAME OR NUMBER OF COW.	Months in lactation.	Pounds of milk.	Average test.	Pounds of fat.	Value of fat.	Total cost of feed.	Profit.	Returns for $1 of feed consumed.
1	No. 36	11	12,959	3.46	448.4	$162 50	$38 92	$123 58	$4 17
	No. 28	12	4,362	4.38	191.1	71 31	28 22	43 09	2 53
	Difference	......	8,597	......	257.3	$91 19	$10 70	$80 49	$1 64
2	Fairmont	10	12,255	3.69	452.4	$166 51	$74 90	$91 61	$2 22
	Queen	12	7,434	3.77	280.2	103 44	66 09	37 35	1 56
	Difference	......	4,821	......	172.2	$63 07	$8 81	$54 26	$0 66
3	Mabel	12	9,165	3.56	326.3	$119 89	$32 40	$87 49	$3 70
	Daisy	11	5,193	3.88	201.5	78 32	30 90	43 34	2 36
	Difference	......	3,972	......	124.8	$46 57	$1 50	$44 15	$1 34
4	Nick	10	8,988	3.67	329.7	$121 10	$41 46	$79 64	$2 92
	Blackeye	11	5,550	3.94	218.7	79 60	43 62	35 98	1 82
	Difference	......	3,438	......	111.0	$41 50	$2 16	$43 66	$1 10
5	Whiteface	12	10,959	3.27	358.3	$134 28	$43 85	$90 43	$3 06
	Flossie	7	5,634	2.81	158.3	60 52	43 85	16 67	1 40
	Difference	......	5,325	......	200.0	$73 76	$0 00	$73 76	$1 66
6	Runt	12	10,707	3.45	369.6	$136 90	$41 31	$95 59	$3 31
	Lena	12	6,747	3.21	216.6	81 08	37 81	43 27	2 14
	Difference	......	3,960	......	153.0	$55 82	$3 50	$52 32	$1 17
7	Lizzie	11	9,078	3.16	286.8	$107 68	$33 56	$74 12	$3 21
	Fanny	7	2,010	4.18	84.0	35 72	31 87	3 85	1 12
	Difference	......	7,068	......	202.8	$71 96	$1 69	$70 27	$2 09
8	Henrietta	11	9,393	3.48	327.0	$122 29	$30 59	$91 70	$4 00
	Daisy	10	5,556	3.43	190.5	72 19	28 76	43 43	2 51
	Difference	......	3,837	......	136.5	$50 10	$1 83	$48 27	$1 49

9	Tootsy	9	7,245	3.96	286.2	$108 87	$38 79	$70 08	$2 81
	Jessie	9	3,837	4.29	164.6	53 09	36 43	16 66	1 46
	Difference	......	3,408	......	121.6	$55 78	$2 36	$53 42	$1 35
10	Olga	10	9,927	3.52	349.8	$180 50	$33 84	$96 66	$3 86
	Black	11	4,020	3.89	156.3	61 74	34 62	27 12	1 78
	Difference	......	5,907	......	193.5	$68 76	$0 78	$69 54	$2 08
11	No. 4	11	8,346	3.71	309.6	$115 71	$44 93	$70 78	$2 57
	No. 17	9	4,557	3.64	165.9	62 14	37 98	24 16	1 64
	Difference	......	3,789	......	143.7	$53 57	$6 95	$46 62	$0 93
12	Lady	11	10,005	3.41	341.4	$118 16	$38 59	$79 57	$3 07
	Kate	12	1,797	2.82	50.7	17 41	31 14	13 73*	55
	Difference	......	8,208	......	290.7	$100 75	$7 45	$93 30	$2 52
13	Princess	12	9,102	3.61	328.2	$122 08	$37 25	$84 83	$3 28
	Nellie	11	4,704	3.69	173.7	64 32	32 08	32 24	2 00
	Difference	......	4,398	......	154.5	$57 76	$5 17	$52 59	$1 28
14	Nigger	11	5,442	4.25	231.3	$85 85	$26 00	$59 85	$3 12
	Horneg	9	2,412	4.22	101.7	36 69	27 60	9 09	1 32
	Difference	......	3,030	......	129.6	$49 16	$1 60	$50 76	$1 80
15	Jersey	12	6,099	3.86	235 8	$87 08	$40 75	$46 33	$2 14
	Maud	7	3,924	3.70	145.2	54 75	40 75	14 00	1 34
	Difference	......	2,175	......	90.6	$32 33	$0 00	$32 33	$0 80
16	Holstein	11	8,292	3.07	254.4	$93 37	$42 22	$51 15	$2 21
	Susie	9	2,901	3.65	105.9	43 84	42 22	1 62	1 04
	Difference	......	5,391	......	148.5	$49 53	$0 00	$49 53	$1 17
	Best cow	11	12,959	3.46	448.4	$162 50	$38 92	$123 58	$4 17
	Poorest cow	11	1,797	2.82	50.7	17 41	31 14	13 73*	55
	Difference	......	11,162	......	397.7	$145 09	$7 78	$137 32	$3 62

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* Loss.

In table 1 a comparison has been made of one of the best and one of the poorest cows in each herd. These cows are all mature and were in the test for the full year.

It is to be regretted that lack of space prevents the publication of a complete detailed record of each cow in every herd. This not being possible, it was decided to publish a complete record of the best and poorest cow in each herd in the test for a full year. The tables also indicate the difference in the amount of milk and butter fat produced, as well as the difference, if any, in the cost of feed consumed. One interesting thing brought out by these tables is the remarkable difference in the cash returns from each cow for each dollar's worth of feed consumed. For instance, in table No. 1 we find cow No. 36 gave $4.17 worth of product for every dollar's worth of feed consumed, while in table No. 12 we find that a cow by the name of Kate returned only 55 cents for every dollar's worth of feed consumed.

(This butter fat was sold in the form of sweet milk on the Omaha market, hence the high average price given. It will, of course, be understood that this price is higher than would obtain where milk is not so well cared for and when sold in the form of cream for butter purposes. While this price is given for the value of butter fat, it is really intended to represent the value, not only of butter fat, but also of the skim-milk portion of the product. This price is possibly not too high when consideration is given to the fact that these farmers were naturally put to a heavier expense by better and more expensive methods of cooling and handling, and the extra expense of delivering every day.)

IMPORTANCE OF A LONG LACTATION PERIOD.

To illustrate the importance of a long lactation period the following table is of peculiar interest:

TABLE 2. *Showing importance of long lactation period.*

NAME OF COW.	Days of lactation.	Lbs. of milk.	Lbs. of fat.	Value of fat.	Total feed.	Profit.	Returns for $1.
Whitie....................	344	10,959	358.3	$134 28	$43 85	$90 43	$3 06
Flossie....................	214	5,634	158.3	60 52	43 85	16 67	1 40
Difference...........	130	5,325	200.0	$73 76	$0 00	$73 76	$1 66

The cow named Whitie milked five months longer and gave $73.76 more profit than the cow named Flossie. Both cows freshened at practically the same time, and at first made a very similar showing.

It is a well-recognized fact that beef cows, or even dual-purpose cows, will produce a fair quantity and quality of milk for some time after freshening. The fact that these very cows generally go dry after having milked from three to six months has frequently been lost sight of by many dairymen. This brings to mind the tester's experience while working with one of the herds. One of the men called his attention to the fact that his Short-horn cows apparently were making as good a record as the average herd of the pronounced dairy type. At the time, the tester admitted that such was the case. However, a few months later

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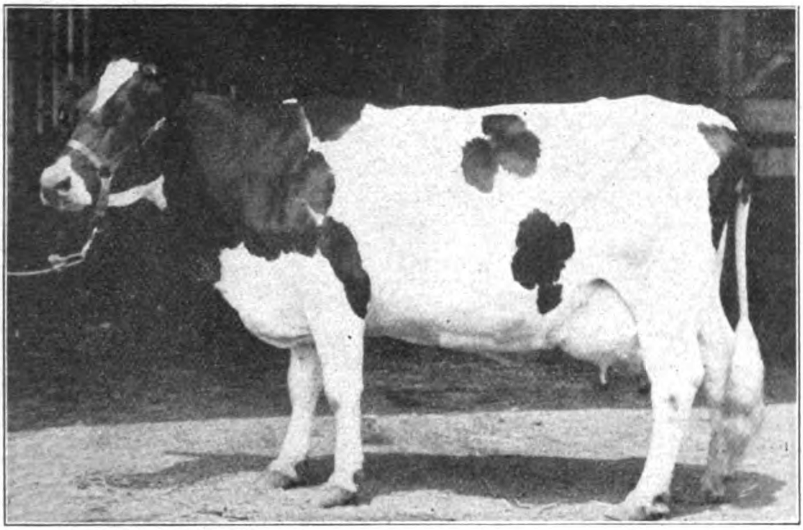
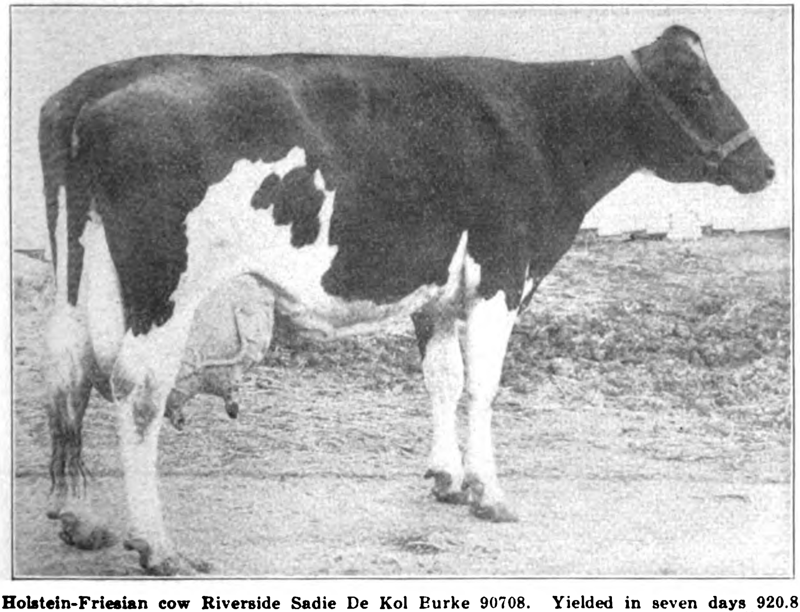
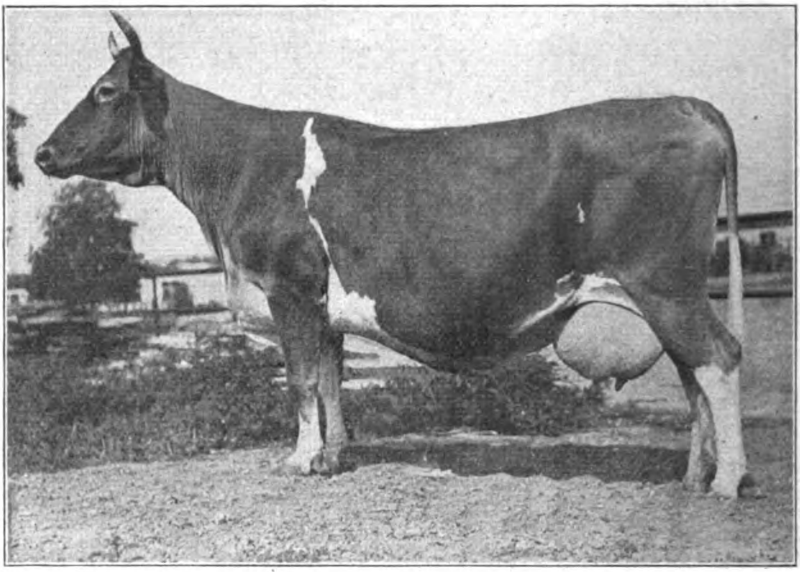


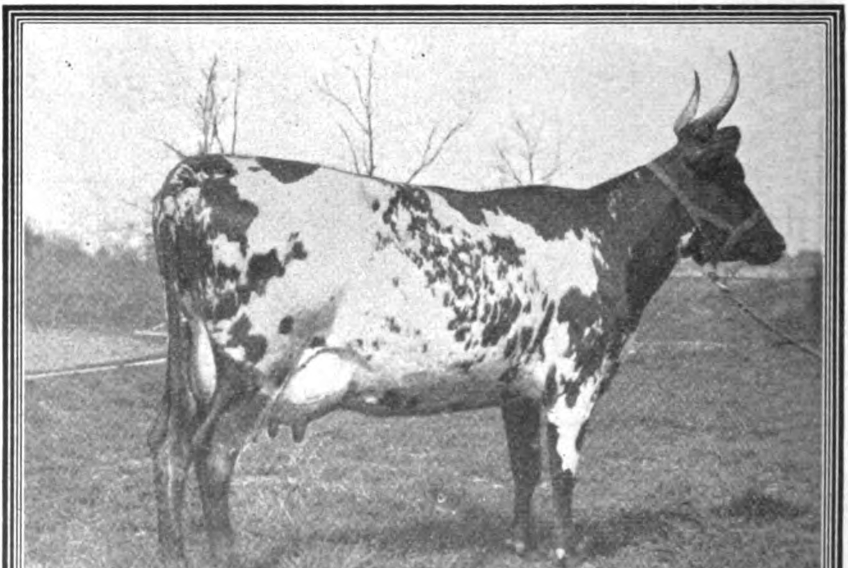
Twelve-year-old Holstein-Friesian cow Aralia De Kol 55194. Yielded in 365 days 28,065.9 pounds of milk, containing 1137.73 pounds of butter on an 80 per cent basis. This milk for the year, the world's record, at 8 cents per quart would have brought $1077.44.



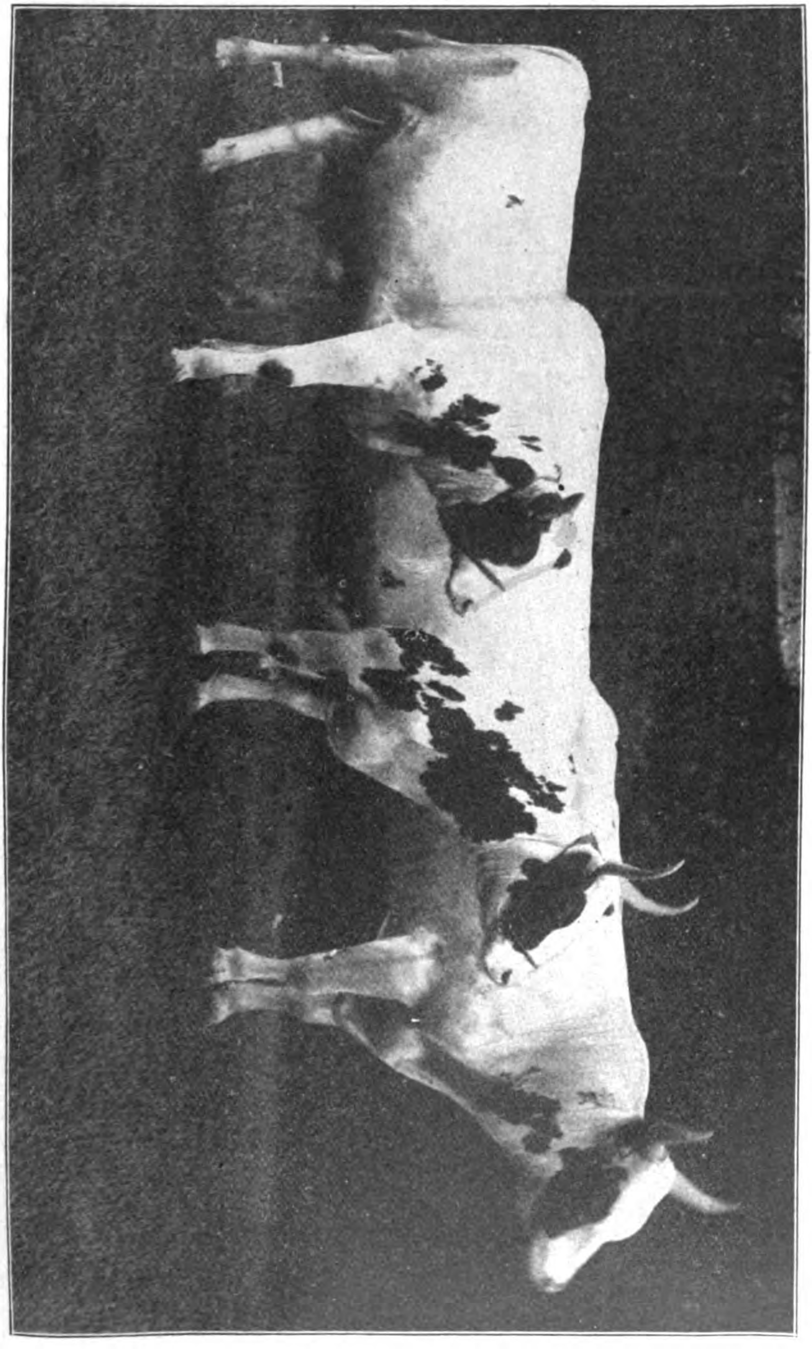
Holstein-Friesian cow Riverside Sadie De Kol Burke 90708. Yielded in seven days 920.8 pounds of milk, or 32.29 pounds of butter. In thirty days, 3735.6 pounds of milk, or 130.14 pounds of butter. In six months, 18,275.8 pounds of milk, the world's record for that period.



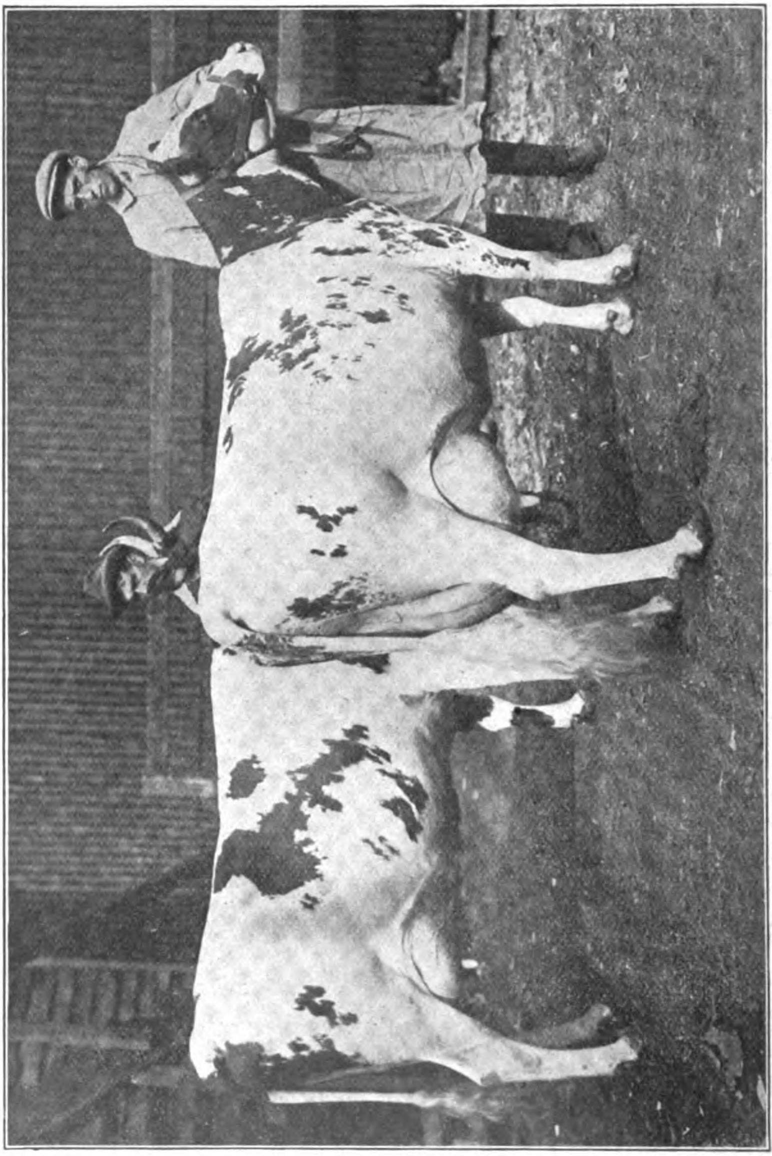
World's champion Guernsey cow, Spotswood Daisy Pearl. Yield of butter fat in one year. 957.38 pounds.



McAlister's Betty, an Ayrshire cow with a great butter record.



Three typical Ayrshires.



Two remarkable Ayrshires. Oldhall Ladysmith 4th, on the left, won the Ayrshire cup at the National Dairy Show; and the other cow, Boghall Snowdrop 2d, was grand champion.

practically every cow in this herd had dried up, while most of the cows of good dairy breeding were still in very good flow of milk. Too often the farmer forgets to make a comparison at this time. It might be said in this connection that after the tester's records began to show the remarkable results due to difference in length of lactation period, some herds were withdrawn, largely because the fact that they would make a poor showing was soon well understood by their owners.

TABLE 3. *Showing the average production per cow, in test for 12 months, of the various herds tested.*

HERD No.	Number of cows.	Average pounds of milk per cow.	Average pounds of fat per cow.
1	25	10,029	348.6
2	21	7,962	313.5
3	8	8,350	272.0
4	7	6,980	266.9
5	10	7,845	265.7
6	5	7,012	260.8
7	5	7,128	242.1
8	24	6,995	240.2
9	17	6,001	239.5
10	26	6,552	229.7
11	11	6,168	228.0
12	12	6,156	224.4
13	12	5,334	205.5
14	5	5,305	199.4
15	8	4,424	174.0

TABLE 4. *Showing the profit from the ten most profitable and the ten least profitable cows.*

Ten most profitable cows.		Ten least profitable cows.	
1	$123 58	1 (loss)	$13 73
2	116 96	2	1 62
3	108 74	3	2 84
4	108 10	4	3 85
5	104 15	5	7 10
6	96 66	6	9 09
7	95 59	7	10 27
8	94 97	8	11 14
9	92 11	9	12 07
10	92 02	10	13 57
Total	$1,032 88	Total	$57 82

From this table the reader will notice that a herd composed of ten of the best cows would yield a profit of over $1032. Compare with this the meager profit of only $57 that would come to the dairyman as a result of a year's work with a herd composed of ten of the poorest cows, and there is at least one evident reason why the farmer who keeps no record of the amount of milk produced and who thinks it of no importance to test the milk for butter fat fails to make dairying profitable.

Because it was so apparent that they were not profitable, between eighty and one hundred of the poorest cows were sold before their records were completed. Many others were weeded out shortly after the yearly record had been completed and published.

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RESULTS.

From information available which induced the farmers to sell their poorest cows it is thought that the productive capacity of the average herd belonging to members of this association was raised at least 50 pounds butter fat per cow, as a direct result of the first year's work of this testing association.

The Babcock test proved this cow's worth.

While an attempt has been made to show some of the direct profits that came as a result of this work, it is impossible to point out the value and importance of the indirect results of work of this kind. Just as an instance of what it means to the farmer in building up his herd, the tester in charge of this work reported that before much was known regarding the cow that afterward proved most profitable her heifer calf had been sold for $5. After the cow had completed her remarkable one-year record the owner was glad indeed to make an extended trip in search for this calf and to trade for it one of his mature cows. It is also estimated that as a result of the first year's work over eighteen silos were constructed in this community.

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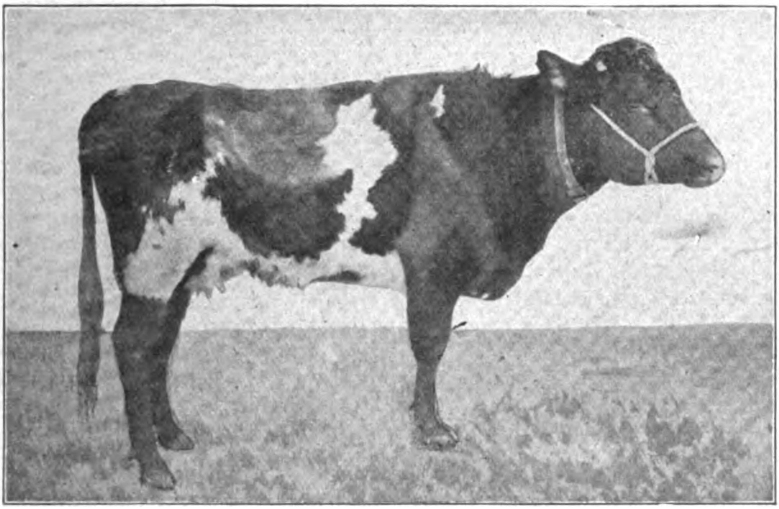
Cow-testing work represents one of the best and easiest ways of making dairying more profitable and desirable. It is well recognized that the remarkable success of dairying in Denmark, Sweden and Holland is largely due to the fact that they saw early the benefits that could be derived from well-conducted coöperative cow-testing associations.

A COW'S PRODUCTION AND KEEP.

A Minnesota subscriber to *The Farmer* writes that journal that he is intending to establish a dairy, and wishes to know "how much milk a Holstein cow will produce in a month or a year and how much net profit she will make; how much feed she will consume." The answer given him is as follows:



The Babcock test proved this cow's worthlessness.

"The quantity of milk a cow will produce in a month or a year depends very largely upon the individual cow, and also upon how she is fed and cared for. Taking the Holsteins as a breed, when given fairly good feed and care they will average between 6000 and 8000 pounds of milk a year. Taking 7000 pounds as an average, this would be about 3500 quarts; or, to figure safe, a milkman might estimate selling 3000 quarts of milk a year from a Holstein. Its value could be determined by the price received for the milk. At an average price of five cents a quart, the milk would be worth $150. At an average price of eight cents per quart (the price that milk commonly sells at in northern cities), the milk would be worth $240.

During the winter months a cow to milk well requires a pound of grain per day for every three pounds of milk she produces per day, and from 18 to 24 pounds of hay. Fodder corn could be substituted for a part of the hay, which would make the ration cheaper, if the fodder corn were grown on the farm. Roots or ensilage should be fed to get the best results. For a concrete example, a cow giving 30 pounds of milk a day, or 15 quarts, would require 10 pounds of grain, from 15 to 20 pounds of hay, and from 20 to 30 pounds of roots a day. If ensilage were fed, the hay might be reduced somewhat. The cost of feeding a cow will depend on whether the feed is home-grown or bought on the market. It will also depend on whether the cow is pastured or largely stall fed throughout the year. Where a cow can be pastured from May till October, the cost of the feed for the year may be estimated at from $30 to $50.

CALF RAISING.

By O. E. Reed, Professor of Dairy Husbandry, Kansas State Agricultural College, Manhattan, at the Board's forty-first annual meeting.

To the general farmer who raises calves for the feed lot, as well as to the dairyman, the question of raising calves is becoming more interesting and important. As the land becomes higher priced, the beef raiser who caters to the general market finds that he can not keep a cow for the entire year merely for the calf she raises. Certainly one solution of keeping up the beef supply in Kansas is raising calves more economically. This means a change in the methods of raising the calves. By selecting cows that are large producers of milk and by milking these cows, selling the butter fat and raising the calf on skim milk, the cost of the calf will be greatly reduced. Enough butter fat can be sold to pay for the keep of the cow, and the calf may be counted as profit.

To the dairyman who is desirous of building up a good dairy herd, the subject of raising calves by hand is even more important. There are two general methods of getting a good dairy herd together. The first is to buy cows, and the second is to raise them. Only a few farmers have sufficient capital to pursue the first method. Besides, good dairy cattle are scarce and high priced. The second-named method is more often followed and is generally more successful. By selecting a good herd bull of one of the dairy breeds and giving careful attention to the raising of the calves, one can start with common grade cattle and in a few years' time build up a good dairy herd. Too often the beginner does not appreciate these facts. He does not raise his calves, but depends upon buying cows to replenish his herd. Such a practice will never result in increasing the standard of the herd to any marked extent.

Where plenty of skim milk is to be had the raising of calves by hand is an exceedingly simple proposition. It has been demonstrated time after time that as good calves can be raised on skim milk as on whole milk. At the Kansas Experiment Station experiments were made with three groups of calves. One lot was fed on skim milk, another lot on whole milk, and still another lot were nursed by their mothers. The following table shows the results of these experiments:

Experiment.	Number of calves.	Days fed.	Av. gain per head.	Daily gain per head.	Cost per 100 lbs. gain.
Skim milk	10	154	223	1.51	$2 26
Whole milk	10	154	287	1.86	7 06
Running with dam	10	154	248	1.77	4 41

The calves nursed by the dam and those fed whole milk made slightly better gains than those fed on skim milk, but it was at much greater expense. The skim-milk calves consumed 122 pounds of grain per 100 pounds of gain, while the whole-milk calves consumed 58 pounds of grain and 31.8 pounds of butter fat in the milk. At this rate a hundred pounds of grain is equivalent in feeding value to 48 pounds of fat. After the calf-feeding experiment had closed the calves which were steers were put in the feed lot and fed for a period of seven months. The results of this experiment are very interesting. The calves in the skim-milk lot made the best gains, those that were fed on whole milk ranked second, while the lot raised by the dam stood last.

Skim-milk calves will not look quite so thrifty for the first few months as calves fed on whole milk or allowed to run with their mothers, but at the end of the year there will not be much difference in size; if any difference, the skim-milk calves will be the better, provided they have been properly fed. The skim-milk calf becomes accustomed to eating grain and hay early in life, consequently when it is weaned the change of feed is not so noticeable as it is with the whole-milk calf, and it does not suffer a setback at this time. The calf that has been fed on whole milk has not been accustomed to getting very much of its nutrients from grain and hay, and invariably it does not gain as rapidly as does the skim-milk calf for the first two or three weeks after it is weaned. Very often one sees small, runty, unhealthy calves that have been raised on skim milk. One who does not appreciate the value of skim milk forms the impression that the condition of such calves is due to their feed. However, such is not the case. Calves of this description are a living monument to their owner's ignorance and carelessness. The study of the following table, which gives the composition of whole milk and skim milk, will reveal the fact that there is very little difference between them:

	Whole milk.	Skim milk.
Water	87.10%	90.50%
Fat	3.90	.10
Casein and albumin	3.40	3.57
Sugar	4.75	4.95
Ash	.75	.98

The skim milk differs from the whole milk in that most of the fat has been removed. The other constituents are proportionately increased. The fat in milk is the least important constituent as far as calf-raising is concerned. On the other hand, the fat is the most important constituent in relation to the manufacture of milk products. The fat is used by the animal body to supply heat and energy and store fat on the body. Other feeding stuff, such as corn or similar grain, can be fed to take the place of fat.

The casein, albumin and ash are the most important constituents of milk for the growing calf. These substances are used by the body for making muscle, nerve, bone, hair, hide, and hoofs. These elements are left in the skim milk. Then by separating the whole milk, selling the high-priced butter fat and substituting a cheap grain ration instead, calves can be raised more cheaply.

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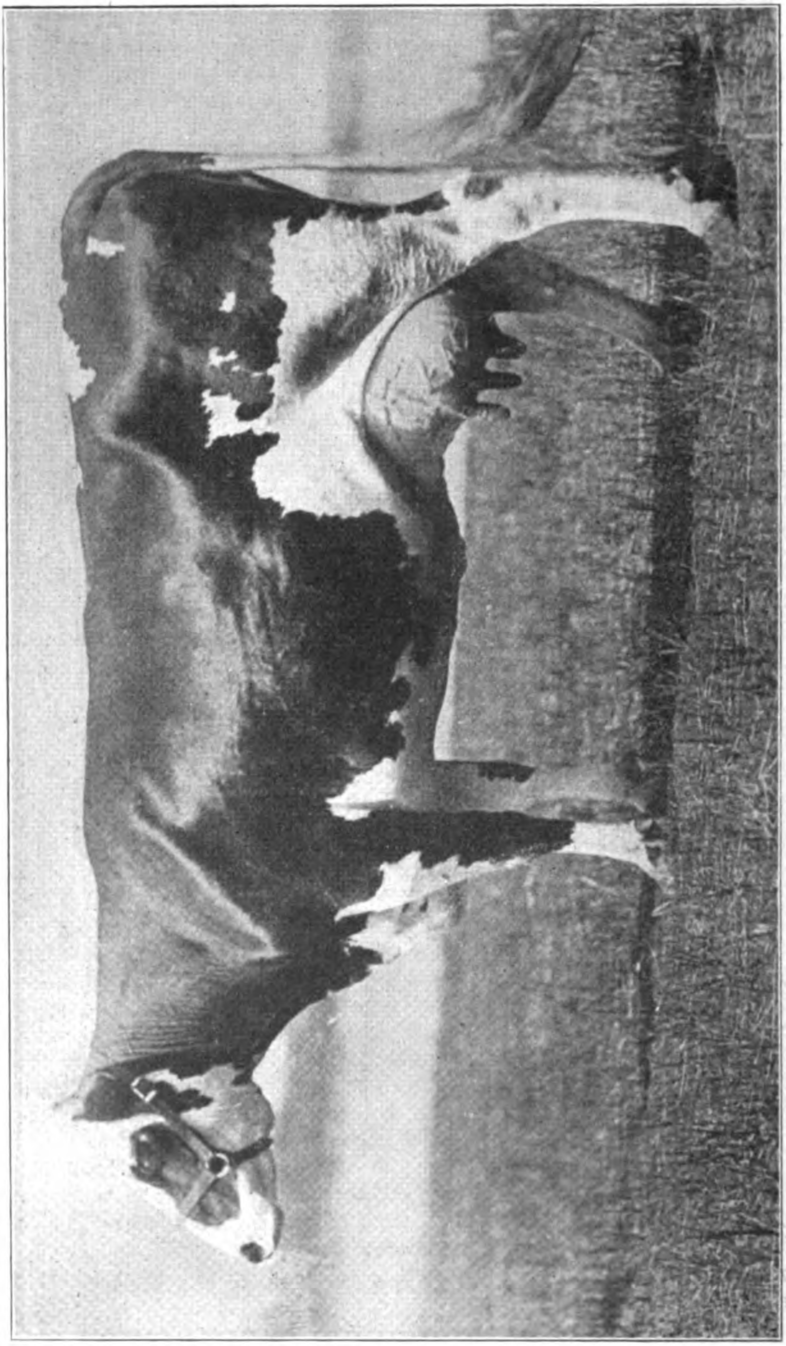

Holstein-Friesian cow Gracie De Kol Ormsby.
Yielded 27.82 pounds of butter in 7 days. Average per cent of butter fat. 4.61.

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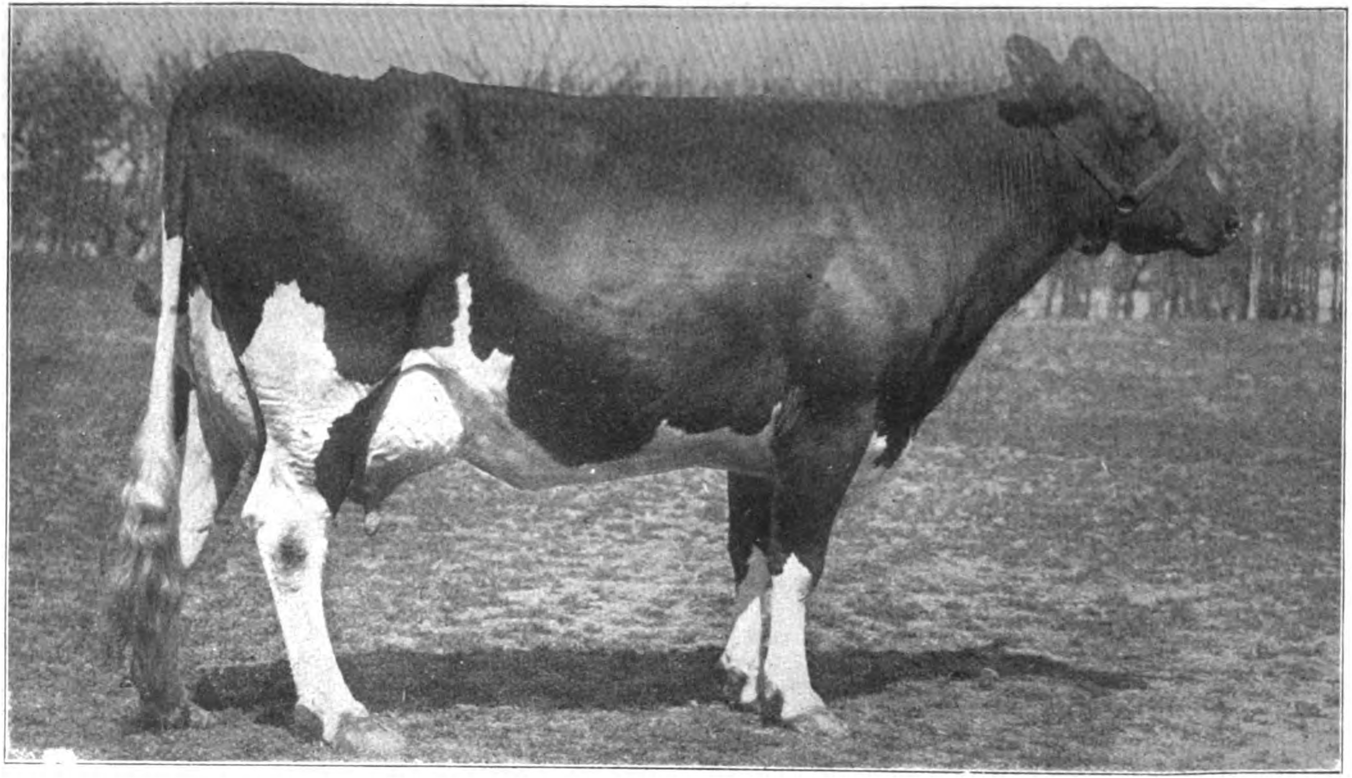

Holstein-Friesian cow Pietertje Maid Ormsby.
Yielded at six years 145.66 pounds of butter in 30 days—the world's record for any breed. Average per cent of butter fat, 4.54.

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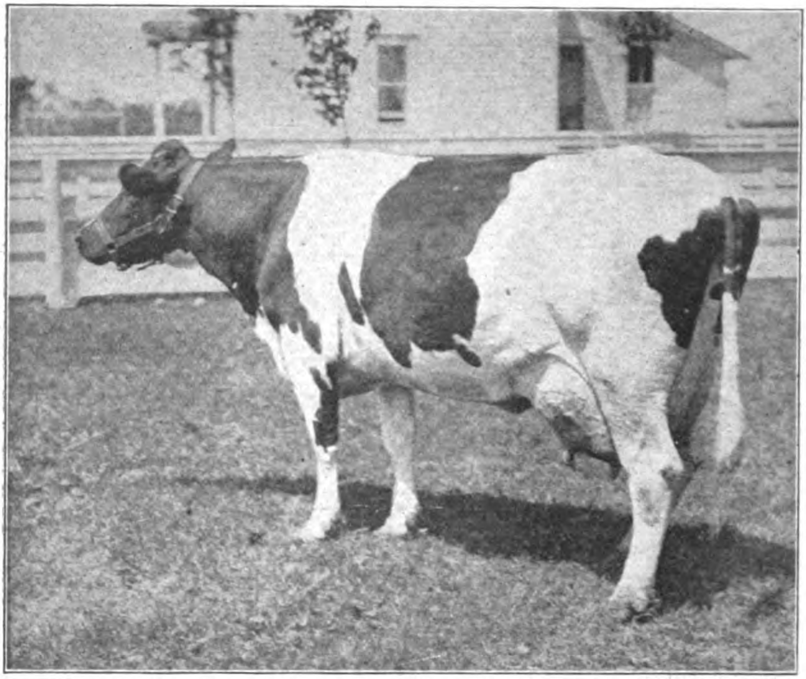

Holstein-Friesian cow College Belle Wayne, at 6 years. Official record for 7 days, 824.3 pounds of milk, 28.3 pounds of butter fat, equal to 35.4 pounds of butter. Record for 30 days, 3338.1 pounds of milk, 116.54 of fat, or 145.68 pounds of butter. Weight one week before calving, 1890 pounds.

TAKING THE CALF FROM ITS MOTHER.

The exact time of taking the calf from its mother will depend upon the condition of the calf and its mother at the time of calving. If the calf is strong and in good condition it may be taken away immediately, without allowing it to nurse. It will be an easier task to teach the calf to drink from the pail if it is taken away from the mother at this time. If the calf is weak at birth, or if the cow's udder is inflamed or caked, it is probably a better practice to allow it to remain with its mother for several days. In case the calf is immediately taken away from its mother it should receive the mother's first milk by all means. The milk at this time contains a high per cent of protein and ash, which act as a laxative and tonic and are very effective in cleaning out the digestive tract and stimulating the digestive organs. In some cases it is not safe to feed the milk from cows to their calves after the first few days. The milk from cows belonging to the high-testing breeds is often too rich in fat for the young calf and should be diluted with skim milk, or milk from some other cow should be fed.

The amount of milk to feed the calf at this time is very important. Under natural conditions the calf gets its milk often and in small amounts, and the more nearly we imitate nature the greater success we will have. The calf of average size should receive about eight pounds of

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whole milk a day at first; large calves should have more than this amount. The milk may be fed in two feeds, night and morning, or better results may be obtained by feeding it three times a day. As the calf grows older the amount should be gradually increased. The best guide as to the amount which should be fed is the calf's appetite. It should be fed sufficiently, but never overfed, and it is a good practice to always keep the calf a little hungry. It should take the last milk from the pail with the same relish as it took the first. It must be remembered that the calf has a small stomach, and there is great danger of overfeeding it. As a general guide for the beginner, the following method may be used to determine the amount of milk to feed:

For the first 100 pounds live weight, feed 10 pounds of milk per day.
For the second 100 pounds, add 5 pounds of milk per day.
For the third 100 pounds, add 2½ pounds of milk per day.

CHANGING TO SKIM MILK.

The time to change the calf from whole milk to skim milk will depend largely upon the development of the calf. If the calf is strong and well developed it may be changed to skim milk at the end of the second week. This change should be made gradually, by substituting a small amount of skim milk for a like amount of whole milk in the daily ration. About a week or ten days should be taken for this change. In this way the calf will go off of the whole milk gradually and will not have a distaste for the skim milk.

Care should always be taken to have the milk warm and sweet. Especially is this necessary when feeding the young calf. As the calf grows older it will do just as well on cooler milk if it is fed at the same temperature every day. The right temperature for the milk fed the young calf is blood heat, 100° F. The milk should be as nearly this temperature as it is possible to get it. There is no way by which we can upset the digestive system of the young calf more easily than by feeding cold milk at one meal and warm milk at another. If there is any doubt about the temperature, or if the milk has to be warmed at all, the thermometer should be used. Judging the temperature of milk by putting the finger into it is not satisfactory. Milk at 90° F. will feel warmer on a cold morning than it will on a warm morning, and the calf's digestive system is very sensitive to any change. It is also important to feed the milk sweet. One feed of sour milk may upset the digestive system of the young calf for months, and one feed of such milk often causes the death of the calf. It is better to let the calf miss one or even two feeds than to feed it sour milk.

The pails from which the milk is fed should be kept as clean as possible. The calf pails should be kept as clean as the milk utensils. If any milk is left in the pails it will sour, and the calf will soon show the effect. The pails should be thoroughly cleansed and sterilized often.

The length of time that the calf should be fed on skim milk will depend upon the amount of skim milk available for this purpose. Some feeders wean their calves at four months of age, but it is a better practice to feed skim milk until the calves are six months old. If one has an abundance of skim milk it is a profitable practice to feed heifers until

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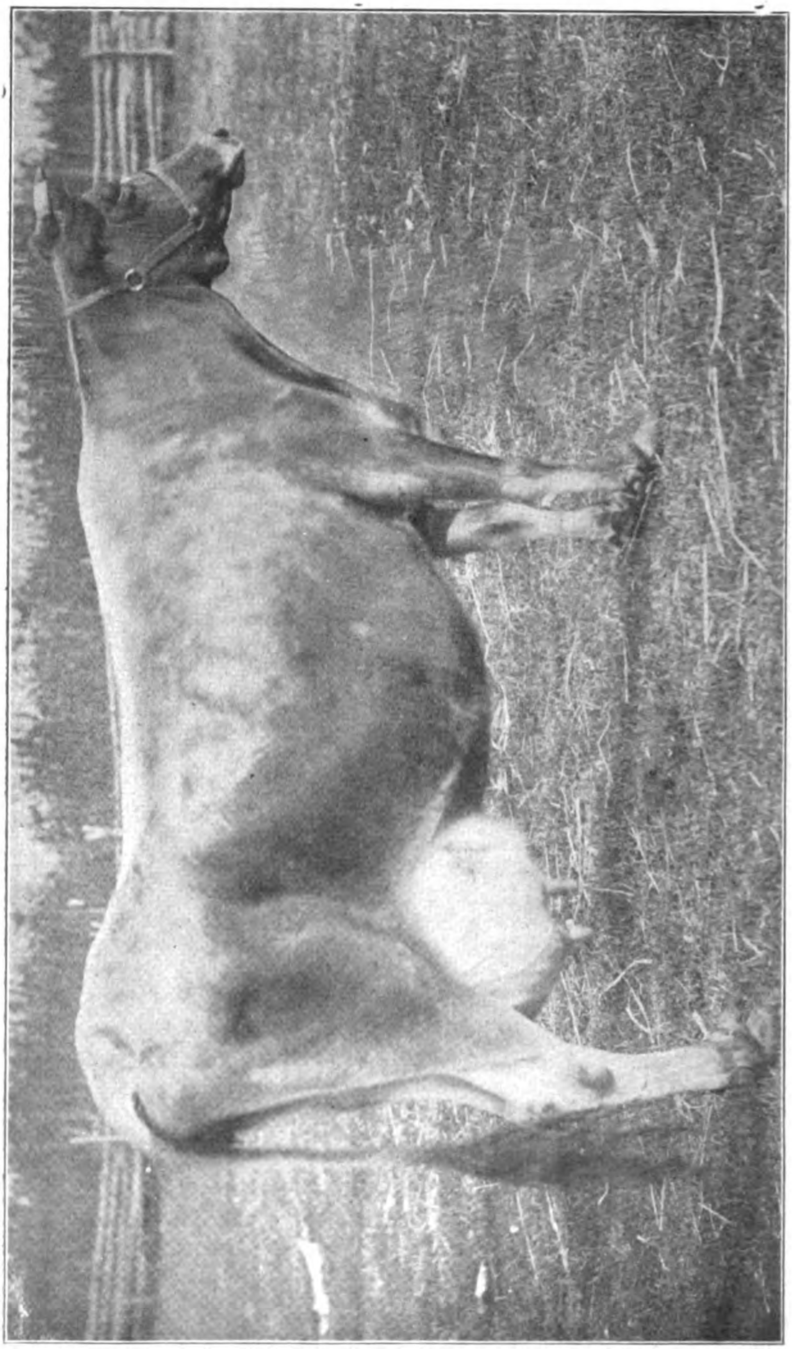
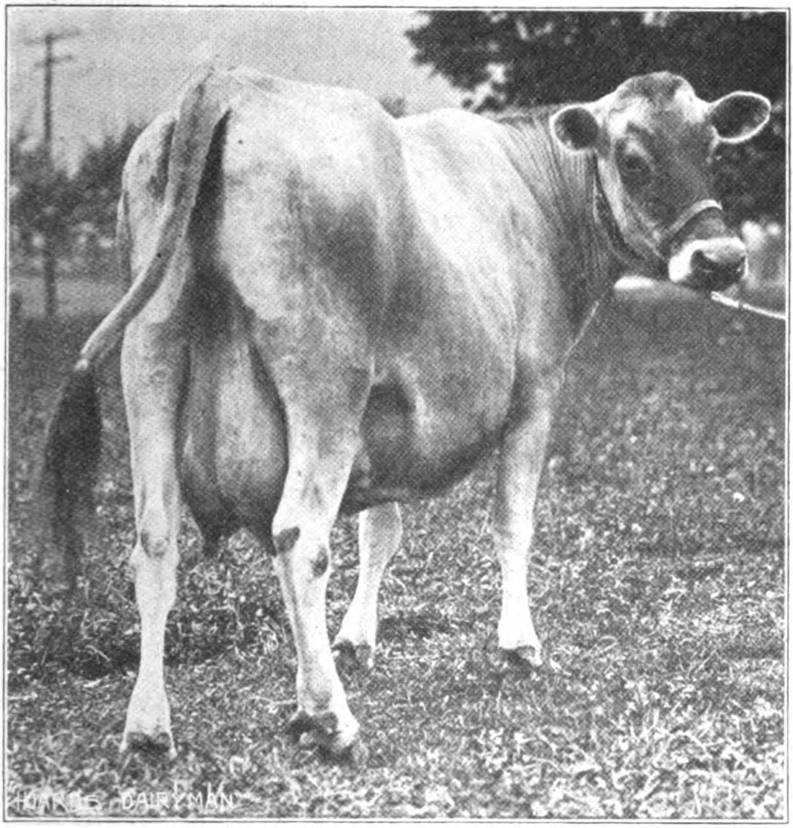


Jersey cow Rosalind of Old Basing.



Jersey cow **Pogis** Irene 2d at 16 years. Record from October 17 to May 16, inclusive: Milk, 5800 pounds; fat, 341.14 pounds; average test, 5.88 per cent butter fat.

they are eight months or a year old. This will insure a better growth and better development.

FEEDING GRAIN AND HAY.

At the time the calf is changed from whole milk to skim milk it will begin to eat grain. The best way to get the calf started to eating grain is by placing a little grain in its mouth after it has consumed its milk. It will like the taste of grain and will soon eat without assistance if the grain is placed within its reach. A great many feeders make a practice of feeding grain with the milk. This is a serious mistake, especially if the grain consists of corn or other starchy feed. Such feeds as corn must be acted upon by the saliva of the mouth in order to insure its proper digestion. When the grain is fed with the milk the calf simply gulps it down and never masticates it in the least. In such cases indigestion often follows. When the calf once begins to eat grain readily, only that amount should be given it that it will clean up at each meal. Here again the appetite of the calf is the best guide as to the amount of

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grain to feed. Usually the calf will not eat over a half pound of grain per day for the first two months. From this time until they are six months old a pound of grain per day will be sufficient.

It has been shown that the skim milk is deficient in fat, and in supplementing the skim milk one must make good this deficiency. Grains which contain a high per cent of carbohydrates may be substituted for the butter fat. Corn or Kafir contain a high per cent of this substance, and on account of their low cost in the corn belt they are the logical grains to feed with the skim milk. Many farmers and dairymen make the mistake of feeding oil meal with skim milk as the only grain ration fed. This mistake is made on account of the idea that some have regarding the composition of oil meal. Many assume that oil meal contains a high per cent of oil, which will replace the fat that has been taken out of the milk. Linseed-oil meal is valuable for feeding on account of the high content of protein. It does not contain a very high per cent of oil. Oil meal may be fed in connection with corn, but this is not entirely necessary, and it is very expensive. The corn has invariably given the best results as a supplement to skim milk. When teaching the calf to eat grain it is better to use corn chop. When the calf gets a little older shelled corn or Kafir may be fed.

Hay should be kept before the calf after it is two weeks old. At this age the calf will begin to nibble at the hay and will soon consume quite a little of it. The eating of hay should be encouraged by keeping nice, clean, bright hay within the reach of the calf at all times. For young calves mixed or prairie hay is better than alfalfa or clover; the latter are usually too laxative and have a tendency to produce scours. After the calf is two or three months old it will do much better on alfalfa and will eat a great deal more of it than of the mixed hay. If alfalfa can not be had at this time, good clover or cowpea hay should be fed. If the calf is on pasture it will not be necessary to feed any hay.

Clean, fresh water should be provided for the calf at all times. Many feeders assume that the calf does not need water on account of drinking milk. It will consume a large amount of water, even after drinking fifteen or twenty pounds of skim milk per day.

After the calf is weaned from milk the grain ration should be somewhat changed. The object in forming a grain ration for any growing animal is to feed them bone- and muscle-forming feeds. The grain ration at this time will depend upon the kind of roughage fed. If alfalfa hay is used the calves will do well on a ration of corn alone, or mixed corn and oats, or corn and bran. If mixed or prairie hay, cane or corn fodder is fed, the grain ration should be changed somewhat. More nitrogenous foods, such as bran, linseed-oil meal and cottonseed-oil meal should make up the grain ration. If the calves, especially heifer calves, are stunted by lack of proper food at this time they will usually develop into undersized cows.

RAISING CALVES WITHOUT SKIM MILK.

On many farms, especially those near the larger milk markets, the whole milk is sold from the farm. On such farms the problem of feeding calves is a more serious one. Here the calf must be raised on the minimum amount of milk, and this is usually whole milk. Some farmers

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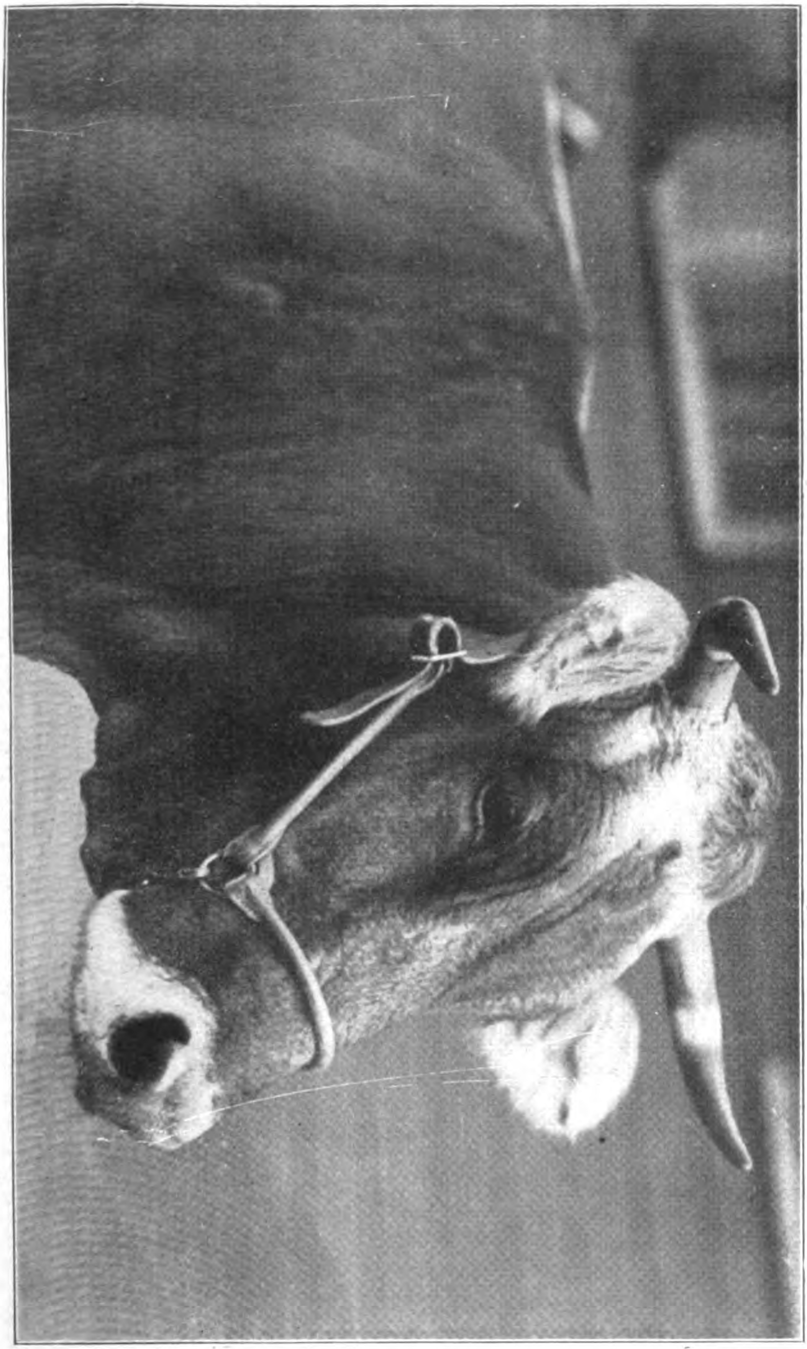
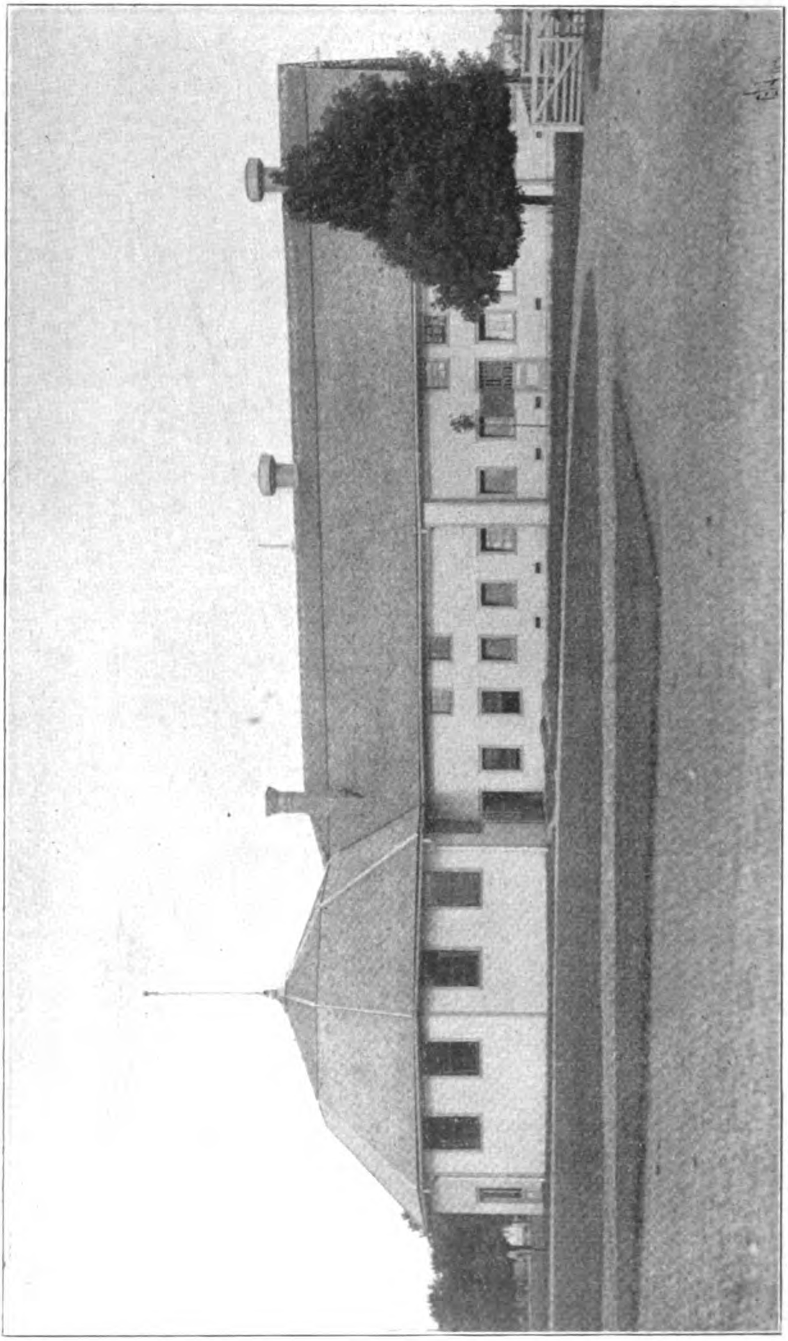


Typical head of a Brown Swiss cow.



Dairy barn at the Indiana Agricultural College.

solve the problem of raising the calves by letting two of them nurse one cow. Often there are cows in the herd that are hard to milk, and such cows are turned over to the calves. In such cases only the very best heifer calves are raised. Where there is ready market for the whole milk, it is a losing proposition to feed whole milk to a calf that will finally sell on a market for veal.

Another solution of this problem is to feed the minimum amount of milk, getting the calf to eat grain, or gruels made of grain, as early as possible. Some feed the milk for two or three months, and at the end of this time the calf is entirely fed on dry feed. This is probably the best method to follow.

Hay tea has been fed with fairly good results. In a trial at the Kansas Agricultural College calves fed on tea made from mixed hay (orchard grass, blue grass and red clover) made less than a pound gain in live weight per day. Some feeders have used tea made from alfalfa hay with good results, but as a general rule the laxative properties of the alfalfa make it almost impossible to keep the calves from scouring. One of the principal objections to any kind of tea is that is it troublesome to make and keep in good condition for feeding. It should be made fresh at least every other day.

There are a great many milk substitutes advertised on the market today, but these are usually expensive, and for the best results some milk should be fed with them.

STABLING THE CALVES.

The calves should by all means be kept in clean, well-lighted and ventilated stables. Where plenty of barn or shed room is at hand, the best method of handling the calves is to keep each one in a separate pen. A pen three feet wide, five feet long and three feet high is large enough to accommodate the calf until it is four or six months old. There are many advantages in keeping the calves in this manner. The calves will not suck each other's ears when they get through drinking their milk, and thereby cause the ears to freeze in cold weather, and they can be given more individual attention. They can be fed as individuals, and a case of scours among calves may be located readily in this manner, and a remedy may be applied at once. Where there is less room to be had, the stanchions will usually give the best results. A stanchion made of wood, by using the following dimensions, will be entirely satisfactory: The stanchion should be made from 3 to 3½ feet high, and 18 to 24 inches from center to center, and neck space should be 4 to 5 inches wide. The stanchion is built in the same manner as the old-style rigid stanchion. The feed manger may be made 12 to 14 inches wide, or wide enough to accommodate the milk pail. The calf should be fastened while he drinks the milk, and the grain fed immediately afterward. By the time the calves have eaten the grain they will lose the desire to suck each other's ears. A part of the manger may be used for hay, but the calves should be loosened from the stanchions after they have eaten their grain. The calf pens and stanchions should be built in the south side of the barn, where plenty of sunshine and light can be had. There is no disinfectant that will take the place of sunshine. During the summer the calf should have access to a pasture lot where there is plenty of shade.

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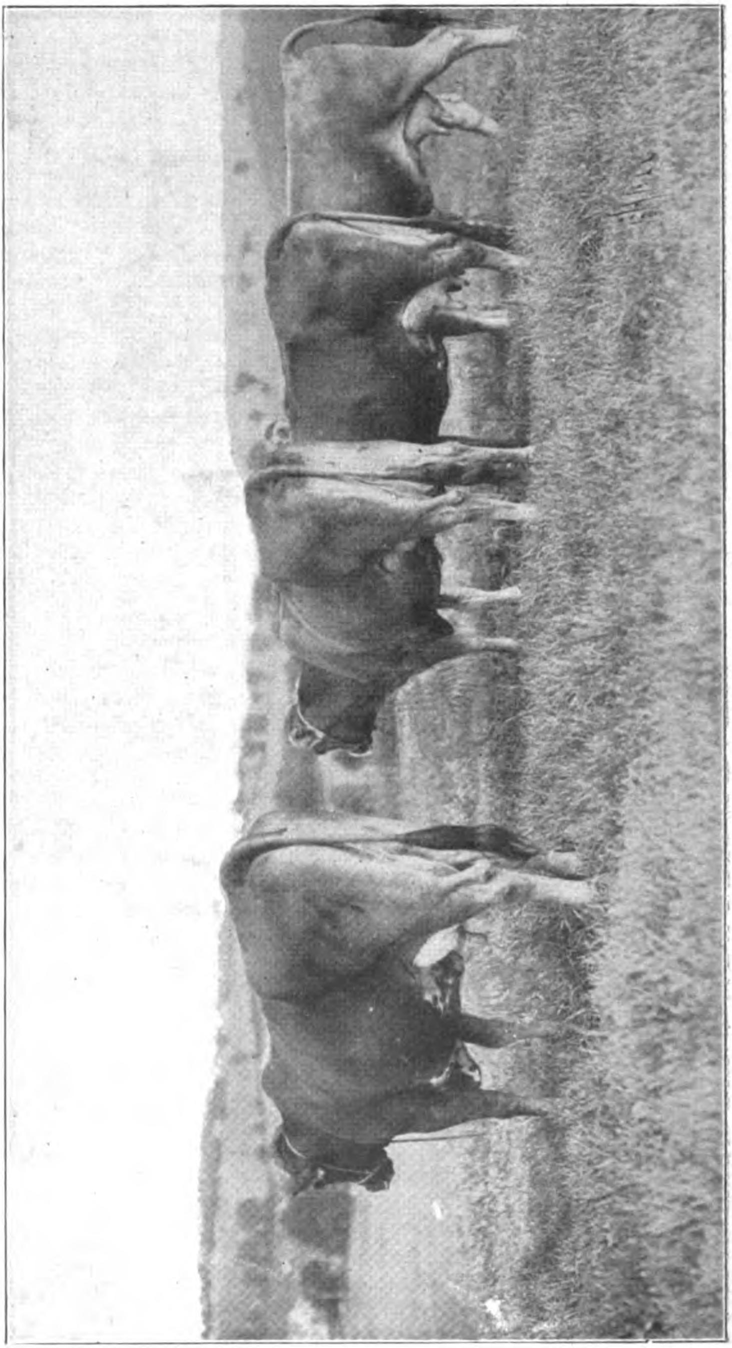

Group of (dehorned) Brown Swiss cows.

SPRING AND FALL CALVES.

The best time of the year to have the calves dropped will depend somewhat upon the market one has for his product. In the cheese-making district, or where the cream is sold for ice-cream making, it is more profitable to have the cows freshen in the spring. Where butter or cream is sold, or where milk is sold for market purposes, it is better to have the cows freshen in the fall. Fall-dropped calves that are to be hand raised will usually make a better growth than calves born in the spring. During the fall and winter more time can be given to care for the calf properly, and when spring comes the calf is ready to make good use of the pastures, and will not be any further trouble or care. In the fall, when they are housed in their winter quarters, they are strong, and on account of being accustomed to subsisting on coarse foods, they will do well on dry feed. The spring-dropped calf is compelled to subsist on dry feed after it is weaned, and will not take hold so readily, thus suffering a setback in its growth.

CALF SCOURS.

The most common disease of the young calf is indigestion, or scours. Naturally the digestive system of the young calf is weak and is very easy to upset. The old adage, "an ounce of prevention is worth a pound of cure," is very applicable here. There are two kinds of scours that affect the young calf—white scours, sometimes called calf cholera, and common scours, caused from indigestion. The white scours is a contagious form, and if the calf becomes affected at all it is within several days after birth. The germs gain entrance to the body through the umbilical cord soon after birth. The remedy for this disease is a preventive one, and the best way to insure against it is to keep the stalls and pens clean. Stalls used for calving purposes should be cleaned and disinfected after each calf is born. Additional precaution should be taken by trying a string around the navel cord of the young calf immediately after it is born, and applying some good disinfectant to the exposed parts.

The common scours, or indigestion, may usually be traced to faulty methods of feeding the young calf. The principal causes are as follows:

1. Overfeeding.
2. Feeding cold milk.
3. Feeding sour milk.
4. Irregular feeding.
5. Feeding alfalfa or other highly nitrogenous hay to the young calf.
6. Using dirty pails.
7. Dirty stables.

The first signs of indigestion or scours among calves is usually the characteristic foul-smelling dung. When a calf shows the first signs of scours the milk should be reduced one-half or more, and then gradually increased again as the calf improves. This method of treatment is usually sufficient to check a mild case. There have been many remedies suggested for treatment of the scours, and all are used with more or less success, but the writer will mention only two in this paper. The feeding of dried blood to calves has proven very effective. In addition to receiving the milk, add about a teaspoonful of soluble dried blood and stir in well with the milk. Dried blood not only acts as a tonic, but it has a food value,

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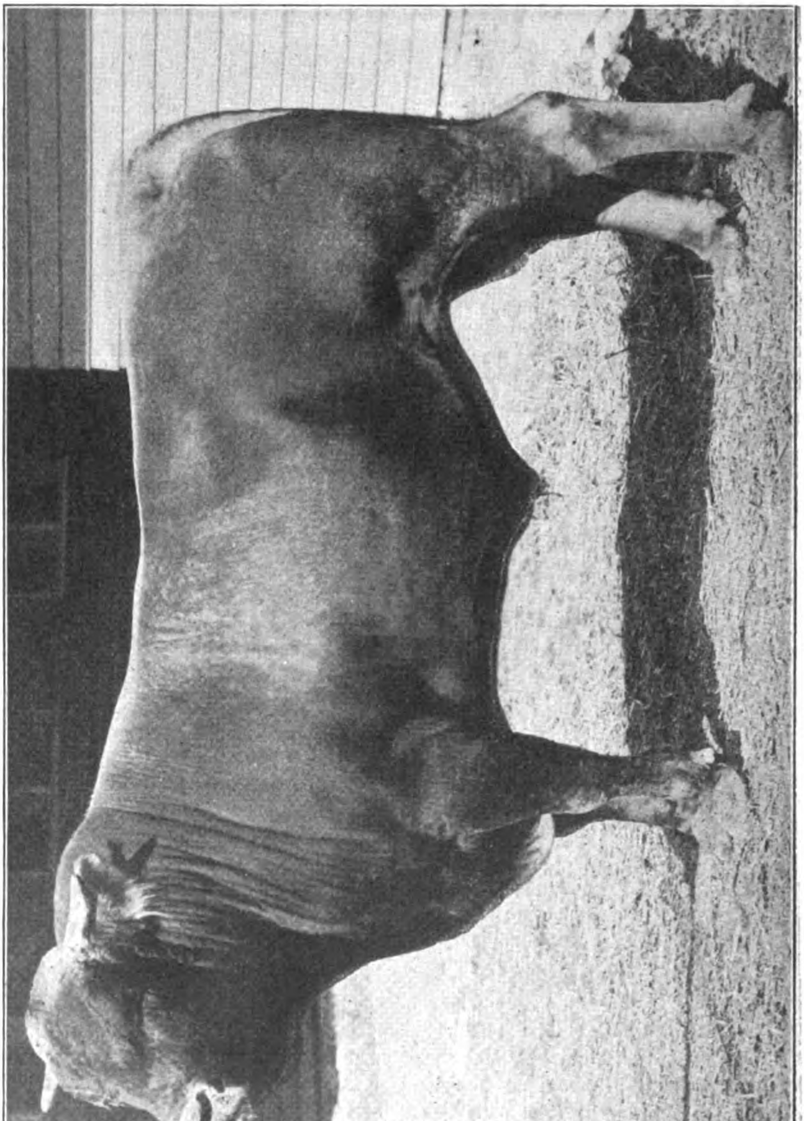
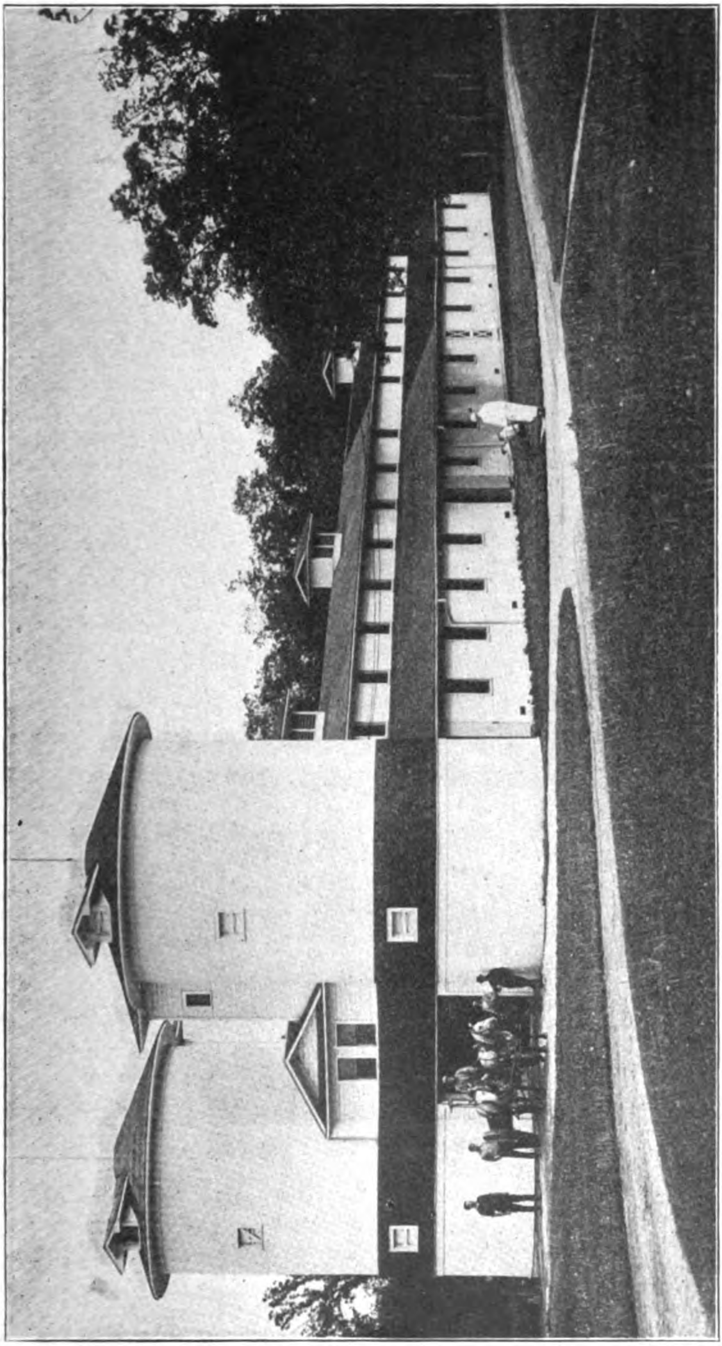


A Brown Swiss bull.



A dairy barn and silo at Hinsdale, Ill.

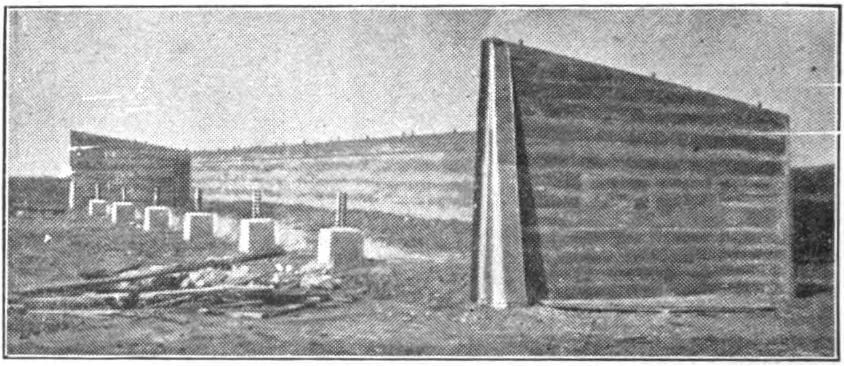
and it is often fed along with milk at each feed on account of its feeding value as well as a prevention treatment for the scours.

Another remedy which has been tried with success is the formalin treatment. This method consists of adding fifteen ounces of distilled water to one-half ounce of formalin. One teaspoonful of this mixture is added to each pound or pint of milk fed. This treatment should be given at the time the feed is reduced, and continued at each feed until the calf shows signs of improvement. These simple remedies, used with judgment and common sense, will usually cure any case of scours, but judgment should be used before the calf becomes affected.

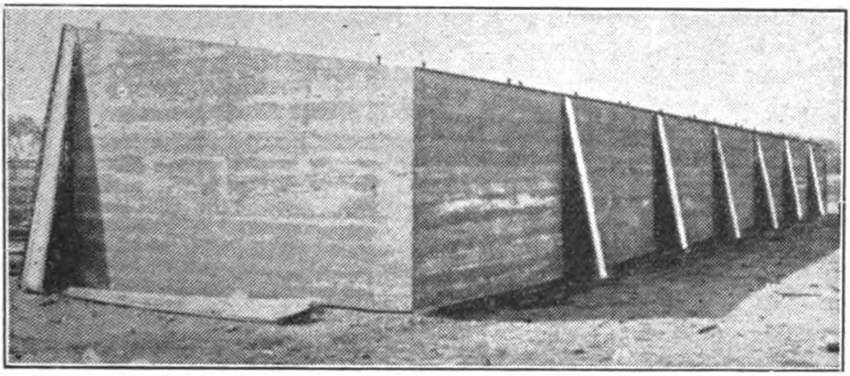
A CONCRETE SHED FOR LIVE STOCK.

C. E. Storer, of Osborne county, Kan., built a concrete cattle shed, and likes it so well that he is already planning to build two more.

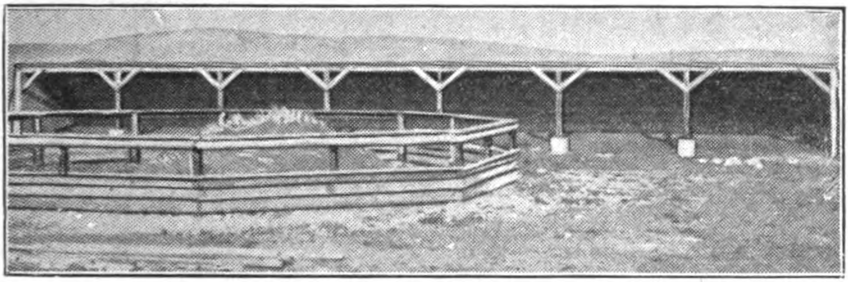
This shed is 84 feet long, 12 feet wide, and 6 feet high at the back. The base of the wall is set in the ground from 12 to 18 inches and is 16 inches thick. The main wall is 10 inches thick at the bottom and 8 inches on top. Heavy, woven hog wire was used for reinforcing, and six pilasters at the back and one at each front corner add extra strength to the walls. Bolts were set along the top of the walls to which the skeleton work for the roof was fastened. The roof is of galvanized corrugated iron. The piers on which the roof supports rest in front were set in the ground about 20 inches. The concrete used was mixed in the proportions of 1 part cement, 4 parts sand, and 4 parts broken rock. It required 108 sacks of cement to build this shed.



Walls and piers of concrete shed ready for supports and roof.



Rear view of concrete shed, showing pilasters or buttresses.



Front view of completed concrete shed.
A type of inexpensive but satisfactory feed rack is shown in the foreground.

METHOD OF CASTRATING DIFFERENT FARM ANIMALS.

By C. D. Smead, V. S., in *Tribune Farmer.*

From time to time I receive letters of inquiry in relation to the best time and the best manner of castrating farm animals, from pet male cats to horses. Of late these inquiries have been so frequent that I feel constrained to write an article upon the subject. In all countries where cattle, sheep and swine are raised the castration of male animals not required for breeding has been the general practice for centuries.

The castration of the colt, or mature horse, will be first considered. Perhaps 90 per cent of the veterinarians of this country and Great Britain agree that the best age, in a general way, is when the colt is about one year old. Yet the question is frequently asked, Why can't the colt just as well be castrated when a month or two months old, as can the calf? Probably in a large percentage of cases it can be, when the animal is strong and vigorous and has no deformity or physical weakness in the scrotal region; but only an expert can decide at that age as to whether or not he is suffering with a scrotal hernia. My own observation has been that at birth 50 per cent of horse and mule colts have the inguinal ring (opening in the abdomen through which the testicle comes down into the scrotum) so relaxed that the intestine comes down with the testicle. After a few days or a few weeks the intestine, as a rule, will be held back in the abdomen by the inguinal ring becoming contracted; but one can never tell with certainty as to this condition. Hence, should the testicle be removed there is great danger of the intestine coming down through the ring and becoming strangulated, causing the death of the foal; or, in case strangulation does not follow, we have a case of scrotal hernia, which we would not have had had the time of castration been deferred until the foal was a full year old.

Again, the operation of castration of the colt, as a rule, causes a greater shock to the nervous system than of other animals, and the young colt, although he appears to be strong vitally, is not in as good condition to withstand the shock as he would be when a year old. I have mentioned a year old under the assumption that the colt of that age is strong and vigorous and that his acts indicate that he is beginning to consider himself a male animal. Under no conditions castrate a colt, even though he is a year or even two years old, if he is run down physically, or the chances are that he will not do well after the operation is performed. While he may not seem to mind the operation and the healing of the wound may be a kindly one, there is likely to be a shock to the nervous system such as to leave him as a spiritless animal forever afterward.

THE BETTER METHODS CONSIDERED.

Previous to the year 1800 the English method was to cast the colt or older animal, securely tie the legs and roll him on his back; then to make a longitudinal incision through the scrotum directly over the testicle, making the cut long enough and deep enough to sever the skin of the scrotum and all other tissues covering the testicle. This allowed the testicle to be pulled out through the wound with the sack which holds the seminal fluid (epididymis), when an assistant had ready several flat pieces of iron or crude knives that had been heated red hot in a fire, and with these dull knives the spermatic cord was burned off. The searing, as a rule, prevented all hemorrhage, and if the hot knife was carefully used no sloughing followed; but when carelessly used there would be sloughing and secondary hemorrhage, from which many a colt died. This method is now rarely practiced in any country.

The clamp method superseded very largely the hot-iron method, and certainly was a great improvement. The clamps were made of pieces of elder bush or sumac, about four inches long, split in halves, and chamfered off and notches cut in them at both ends. The two pieces were tied together at one end, so that they resembled a wooden clothes pin. These were usually smeared with salve made by melting together red oxide of mercury and rosin. The clamps were made to encompass the spermatic cord above the testicle and sack spoken of, and the other ends were drawn closely together and tied with a strong twine. This stopped all pain as soon as drawn tightly together and securely tied. Then the testicle and sack were severed below the clamp, and the job was done, all except cutting the twine on the ends of the clamp, usually about twenty-four hours afterward. Some left them on for forty-eight hours. It is no serious trouble to cut the string holding the clamps, and they will drop off. The colt should be kept in the barn until this is done.

Although nothing was known about germs or antiseptic surgery when the clamp came into use in castrations, when the mercury and rosin salve-powder or ointment was smeared on those clamps one of the very best germicides was used, as the watery secretions coming from the wound came in contact with the ointment and dissolved enough of it to wet the wound and kill the germs left there by the germ-laden hands or knife of the castrator, and the wound, as a rule, healed kindly. Hence it is we are to-day seeing less trouble under the old clamp method in the ordinary castration of colts than we do in the more scientifically modern methods. This need not be so if all castrators could be taught to disinfect their hands, their castrating knife and the instruments they use in severing the testicle from the cord.

Modern instruments in general used in the castration of colts, mature horses, bulls and aged rams are either the instrument known as the écraseur or emasculator. The écraseur is of several different makes, but all are alike in principle, being simply a small square-linked chain made into a loop, which is placed around the spermatic cord above the testicle. Then with a screw the loop is tightened so as to mangle off the cord with the chain. It is far more painful than when the cord is scraped off with the knife or cut off. The mangling off of the cord so severs the arteries that little hemorrhage follows as a rule; yet sometimes, in case the artery is large and the castrator hurries a little, the artery is not so mangled and severed as to stop hemorrhage, and not infrequently there will be considerable loss of blood; yet rarely will a colt bleed to death, but he may bleed to his injury. Another danger from the method is that the slow method and mangling of the cord frequently causes the animal to struggle, and unless great care is used there is a pulling on the cord which may cause the cord to be torn loose from its attachment near the kidney, when a stiffness will follow, if not a cord hanging down through the wound. Also, mangling off the cord not infrequently creates an organized enlargement on the end of the severed cord that prevents the cord being drawn up through the inguinal ring into the abdomen, and what is known as a champignon, or tumor, on the end of the cord may form.

The emasculator is simply a pair of pincers with dull teeth on the jaws. The jaws of the pincers are placed on the cord at the point the castrator desires to sever it, and the handles of the pincers are brought together. This mangles off the cord, and so macerates it as to stop hemorrhage. All in all, it is less painful to the animal and does its work more quickly, and, in my opinion, more safely. The use of either instrument requires greater skill than does the old clamp, and all that can be said in favor of either over the old clamp method is that it saves further attention to the patient when all goes well.

WHY EMPLOY THESE METHODS?

The question is frequently asked, Why can't the cord be cut off or scraped off or pulled out in the case of a colt as well as a calf, lamb or pig? The answer I will make briefly: The arterial circulation in the horse is greater in the generative organs than in other animals, and many a colt would bleed to death if some means were not used to close the artery. The ligating of the vascular part of the cord with silken cord was at one time tried in England, but the practice did not give good results. It may be that the bad results came from germs being carried on the string used into the wound and poisoning it. Now that the world knows of germs, of the use of antiseptics in all surgical operations, I believe that the ligating of the vascular part of the spermatic cord in the castration of colts and horses can be made the least painful and the safer method. I have with universal success used this method on bulls, rams and boars.

ANTISEPTIC SURGERY.

I have spoken of the use of antiseptics. That may sound to some readers as something requiring great skill, when, in fact, it is what every boy and girl ten years old ought to know all about. We are living in an age when the unseen things are the dangerous things. A scratch of a pin on one's hands may result in a case of tetanus or blood poison, and every person should know that an antiseptic or germ killer should be used right away. Carbolic acid, one part, and water, ten parts, will kill most germs; so will a thousandth solution of bichloride of mercury. But both are poisonous if swallowed or carelessly used. My preference is a five-hundredth solution of chinosol, as it is just as effective and nonpoisonous. A bottle of it is in my kitchen cabinet as well as in my medicine cabinet. I never castrate any animal that I do not use it to clean my hands and my knife and to wash the scrotum of the animal before I make a cut. Then when I am through I sop the wound with it, and have no fears whatever of results.

I will now drop the castration of colts and horses by saying that with the simple rules followed any man can safely castrate his own colts. Special cases will of necessity require the services of men specially skilled in that class of work.

As a rule, when a calf is strong and robust he is old enough to be castrated when from three weeks to six weeks old. In doing this, the better way is to make the incision on the side of the scrotum, and not clip off the end. It adds to the looks of a steer to have all of the scrotum left. Make the incision just large enough to allow the testicle to come through nicely; bring it into view, and clip off with the knife all the white portion of the spermatic cord, and gently scrape the red or vascular part of the cord until it is severed, and no serious hemorrhage will take place. Then remove the testicle on the other side in the same way, and wind up the job by pouring a little of the antiseptic in the wound. Always wet the scrotum as well as the hands and knife in the antiseptic, and the calf will rarely ever miss a meal.

THE CASTRATION OF A BULL.

This can be done without casting him, but, as a rule, a better job can be done by laying the bull down and tying his hind feet. Make the incision in the scrotum the same as in castrating the calf, and bring forth the testicle and cut the white portion of the cord. Then, with a white silk cord, tie the red portion containing the arteries, draw the cord tight enough to stop all circulation of blood, and then sever the cord about half an inch below the cord. The best cord I ever used in ligating is made by twisting four or six strands of white silk thread together. Linen thread is also good, and any uncolored thread that is stout and small will answer when the silk is not at hand. Leave about six inches of the thread hanging out of the wound; then pour some of the antiseptic in the wound, and you need not worry about the bull not doing well.

THE CASTRATION OF LAMBS.

As a rule, when the lamb is about two weeks old he will suffer less from the operation than at any other age. The common custom is to clip off the end of the scrotum in castrating young lambs, but no more should be clipped off than is necessary to bring the testicles in view. Cut through the sheath covering the testicle—dartos, so called. Some operators then pull out the testicle, cord and all. While this stops all hemorrhage, it inflicts by far the most pain of any known method. It is more quickly over with, but the shock is far greater, and the lamb suffers intense pain for several minutes and sometimes several hours. I never have seen any advantage over the method of scraping the cord, which causes far less pain. In lamb castration, as in calf castration, bad conditions following can be prevented by the chinosol solution. In fly time the oil of tar can be poured in the wound, which will keep flies away.

THE CASTRATION OF OLD RAMS.

Never castrate rams in extremely hot weather. Better do it in the fall when it is convenient to do so. Shear all wool off the scrotum and use the antiseptic. Then proceed as in the castration of bulls. Old rams, by the way, suffer more by castration than do stallions and bulls; and, as a rule, when past two years old it is better to sell them for what they will bring than to make stags of them. If they are of the horned breeds their sale will be no better in market castrated than uncastrated. In the case of the polled breeds, it may be best to castrate them; but do it in cool weather, as in warm weather the fleece and castration combined prevent a quick rallying from the operation.

CASTRATING PIGS.

When pigs are from three to six weeks old there is practically no danger in castrating them. In performing the operation use always the antiseptic, washing the scrotum and hands and knife, and see that the pen is clean and the nest they sleep in is dry and recently made of clean straw. When a pig does not do well after castration it can always be attributed to filthy conditions, and filthy conditions always mean germs of some kind. Hence, cleanliness in all things should be the rule, especially when operations are to be performed.

It is very common for male pigs to be born with scrotal hernia. When pigs are thus born it is rarely the case that nature effects a cure. But the owner need not consider them valueless. A large percentage of pigs so born can be successfully castrated, and no great skill is required, either. The first important thing is a strong man to hold the pig, the best age to operate being when the pig is about six weeks old, when he is usually large enough to make a fine roast pig in case the operation should not be a success. But operations should be successful in nine out of every ten cases. Have the assistant hold the pig up by the hind feet with the back toward the castrator and the head between the feet of the holder of the pig. When so held the intestines will drop back into the abdomen, and nothing will be left in the scrotum but the testicles. Treat the hands, knife and scrotum with the antiseptic. Then make the incision as high up on the scrotum as can be, and this incision just as small as will admit the testicle to come out through it. Draw the testicle out and, to prevent all possible chance of hemorrhage, cut off all the white or tendonous part of the spermatic cord; then, with either a single white silk or a linen thread, tie around the red or vascular part of the cord. Cut off the testicle a quarter of an inch from the thread. Draw the thread as tightly as it will stand without breaking, and it will shut off the circulation of blood. Leave about two inches of the thread protruding from the wound. With a sponge squeeze some of the antiseptic in the wounds and let the pig go. This is all that is necessary in five out of every six cases. In the sixth case it may be well to take about three stitches in the covering of the intestines, making each separate. This will require a curved needle and a three-strand silk cord. Cut the cord close, and what will be left of the thread will do no harm in case it never comes away.

CASTRATION OF THE DOG.

Well-bred dogs sometimes have such a desire to roam and get into mischief that it becomes necessary to castrate them or kill them, the last of which the majority of their owners hesitate to do. In case of a small dog a muzzle can be placed on him and a strong man can hold him while the castrator removes the testicles. In the case of a large dog he can be muzzled and a halter can be placed on him and his head be drawn through a circular hole cut through a board nailed to two posts, and the halter tied so as to keep his shoulders well up against the hole in the board, or he can be held by a strong assistant. If he is tied the assistant can aid the operator by holding the hind legs so as to prevent much struggling. In this case use the antiseptic as in other animal castration, and sever the spermatic cord by scraping with the knife, and there will not be sufficient hemorrhage to harm the patient.

The best house cat is the gelded cat. He becomes neat in his habits and can be taught to hunt mice and rats as well as to be made a family pet, and no more profitable animal can be kept on a farm as a protection against rats and mice. The best time to geld a kitten is when about half grown. The best of all ways to confine him and protect yourself against his teeth and claws is to use a length of five- or six-inch stovepipe. Place the head and fore feet in the pipe and have the assistant firmly grasp the two hind feet and sit across the length of stovepipe. No antiseptic is needed after the operation, as the cat will lick the wound as soon as the operation is over and do all necessary disinfecting. Sever the cord by scraping and there will be no harmful hemorrhage. When the job is over the assistant can let go the hind feet and the cat will crawl through the pipe and never mistrust you as the cause of the pain inflicted.

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GROWING AND MARKETING WOOL.

From Circular No. 161, by W. C. Coffey, assistant chief in sheep husbandry, Illinois Experiment Station.

Those familiar with the ways of growing and preparing wool for market in the countries of greatest production admit that the United States is behind in her methods. Since the wools produced in the farm flocks of the central and eastern parts of our country come in direct competition with foreign wools, carefully grown and prepared for market, better methods are imperative if satisfactory profits are to be made on the wool crop. The following discussion is submitted with the hope that the facts stated and the suggestions given will assist in placing on the market a better wool product from our farm flocks.

To sell at a good price, an offering of wool should be uniformly good, which means that it should be even in structure, length, and strength of fiber, and that it should be as nearly free as possible from foreign matter, such as dirt, chaff or litter, burrs, and tar or paint marks.

THE BREEDING OF THE FLOCK.

If the wool is to be fairly uniform in structure and length, the individuals in the flock must be similar in breeding. By using pure-bred rams of the same breed for a series of years, any flock can be graded up so that the type of wool will be sufficiently uniform in the particulars mentioned to satisfy the demands of the market, provided proper attention is paid to the fleeces of the rams purchased and of the ewes reserved for breeding. The ewes should be alike in fleece characteristics. In addition to other very necessary requirements aside from wool, they

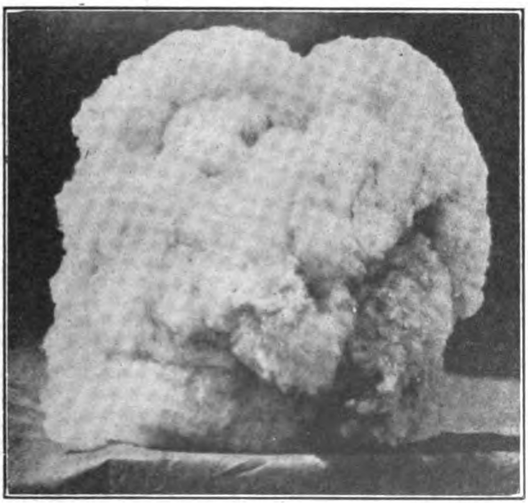

Fig. 1.—A nine-pound fleece in good condition and properly tied with the flesh side out.

should carry fleeces even in quality, density and length. This is not meant in an absolute sense, for such is next to impossible. It is well known that the wool is almost never as fine on the thighs as on the shoulders, and that it is rarely as long on the underlines as it is on midside.

The prevailing blood in the farm flocks of the Middle West is of the English Down mutton breeds, such as Shropshire, Oxford and Hampshire. Any of these, under favorable conditions, produces wool which will meet with ready demand. So far as the wool product is concerned, the use of rams of different breeds is not only unnecessary but undesirable, as it lessens its uniformity.

FEEDING THE FLOCK.

Unless the animal is properly fed the wool will not be strong and even in size. If the food supply is reduced to a point below the normal demands of the animal's body, the wool fiber is reduced in diameter and a weak place is the result. This greatly reduces the commercial value of the combing wools, such as prevail in most sections where farm flocks are kept. In the process of combing, the fiber breaks at the weak place and the wool has to be put to some use of less value. It is therefore necessary for the owner to provide feed sufficient to keep his flock well fed throughout the year.

HEALTH OF THE FLOCK.

If the animal is in poor health, the effect on the growth of the wool is similar to insufficient feed. Sheep often shed or slip their wool as a result of a feverish condition. Any severe illness extending over sufficient time to reduce the animal in flesh will almost invariably cause a weak place in the wool. In the production of good strong wool the health of the animal is just as essential as proper feeding.

FOREIGN MATERIAL IN WOOL.

While lack of uniformity in breeding, improper feeding, and disease each contribute to the criticism made against the wools produced in farm flocks, by far the greatest amount of fault is found because of the foreign substances they contain. Some of these substances get into the wool while it is on the sheep, while others gain entrance through faulty methods of shearing and packing. If there is a great deal of foreign material in wool, it is impossible to remove all of it through the process of scouring. If it is left in, the result is a fabric with noticeable defects; if it is removed, it is by treating with a weak solution of sulphuric acid and heating (a process known as carbonizing), which may weaken the wool fibers. This not only lowers the value of the wool for manufacturing purposes, but also adds to its cost to the manufacturer because he has to spend upon it the extra labor of carbonizing.

Farm flocks as a rule are small, and in many cases they are kept to eat down the weeds that grow in pastures, wood lots, and truck patches. After the corn is harvested, they are usually given a run in the stalks. In all of these places burrs are likely, unless the farmer uses care in keeping them down. The cockle burr, so common in nearly every locality, is very injurious, because it becomes so completely entangled in the wool that in its removal fibers are broken and small woody particles from the

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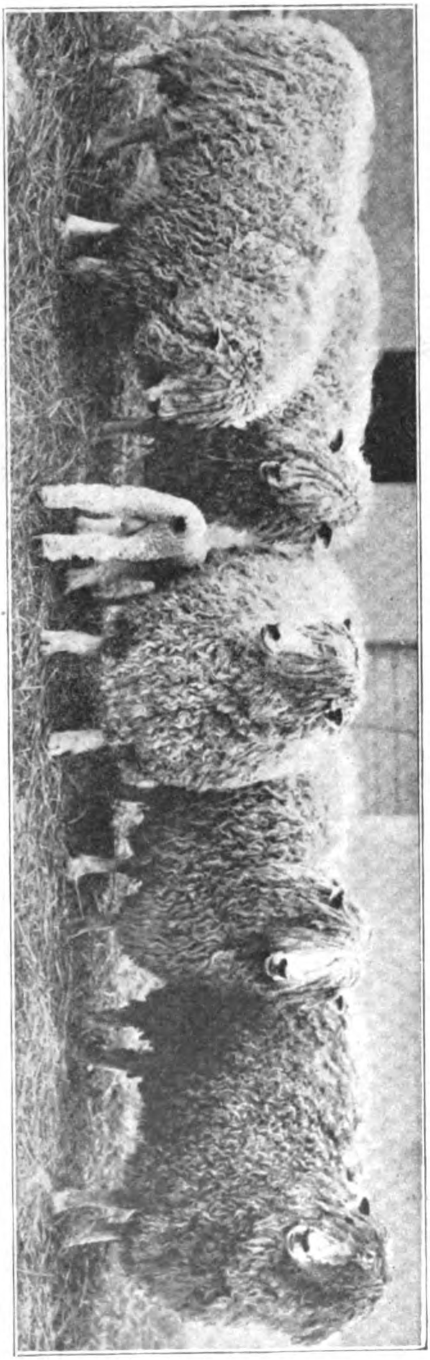

A group of admirable Cotswolds.

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burr are left in the fleece. Not infrequently the statement is made that sheep are kept to gather cockle burrs. Whether the statement is made in seriousness or in jest, the point in question is that the practice would be a poor one. Not all the burrs are gathered by the sheep; a sufficient number for the next year's crop are left on the infested ground, and not all the burrs that cling to the wool get such a hold that they will remain in it permanently. They are dropped at various places over the farm, and instead of an effective gathering there is a scattering.

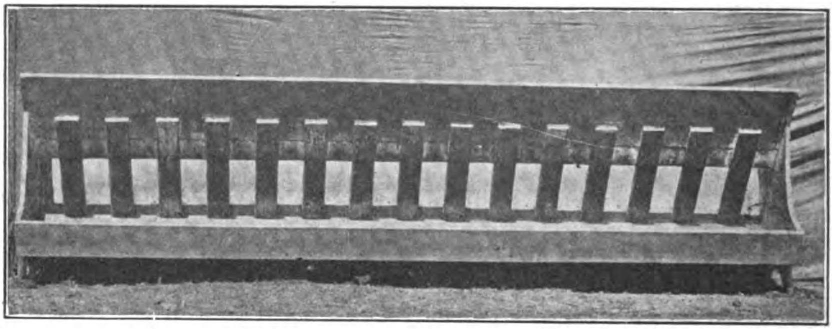

FIG. 2.—A combination grain and hay rack so constructed that chaff and litter can not fall on the necks and shoulders of the sheep.

Carelessness in feeding causes a great deal of foreign material to be deposited in wool. Racks for roughages such as hay, fodded and straw should be constructed so that chaff can not fall out and lodge on the shoulders and necks of the sheep. Barns and lots should be arranged so that it is unnecessary to pass amongst the sheep in carrying loose straw to the racks. It is well to remember that the equipment necessary to keep chaff and litter out of the wool, as suggested above, also results in a saving of feed. Usually that which sifts out and is lost is the most palatable and nutritious part of the feed; hence there is good reason for keeping it out of the fleece, aside from the damage it does to the wool.

Care should be taken to keep dirt and dung out of the wool; neither of these damages wool as much as burrs, chaff and litter, but they do some damage, and they most certainly make it less attractive to the buyer and add to the shrinkage in the process of scouring. Sheep should not be forced to lie in mud, nor should they be allowed to lie in dusty places. Those who run their sheep on plowed lands have difficulty in providing clean resting places for them, and we can not expect the wool to be as clean as it would be were their sheep kept on pastures. Tags of dung are very heavy, and since they usually contain much moisture they often cause the wool to mold. There is no excuse for wrapping dung tags in wool if proper care is taken at shearing time, but it is better to handle sheep so that comparatively little dung will cling to the wool. All the sheep in the flock should be docked, and, late in the autumn, the wool should be sheared off around the dock. Dung clings to the wool only when the feces are soft or when the animal is scouring. When the animal scours

Front view of a Horned Dorset ram.

is should have a change of feed, and possibly medical attention, so that a case of chronic scours will not develop. If these suggestions are put into practice, there are not likely to be many dung tags at shearing time.

PAINT AND TAR MARKS.

Oil paint and tar marks are very objectionable in wool, but their use is not common in farm flocks. They are objectionable because they can not be removed in scouring. The manufacturer is obliged to employ labor to cut them out before the wool is scoured. This reduces the length of the wool to such an extent that its value is impaired. The paint and tar clippings are of very low value and hence the objection to them is thrice emphasized. In case it is desirable to wool-brand, there are marking inks or fluids on the market which do no damage to the wool because they come out in the process of scouring.

INFLUENCE OF EXTERNAL PARASITES.

Keeping the flock free from external parasites does much toward bettering the wool product. They irritate the skin and cause the sheep so much discomfort that they do a great deal of rubbing against fences, barns and racks in an effort to obtain relief. This tangles and breaks

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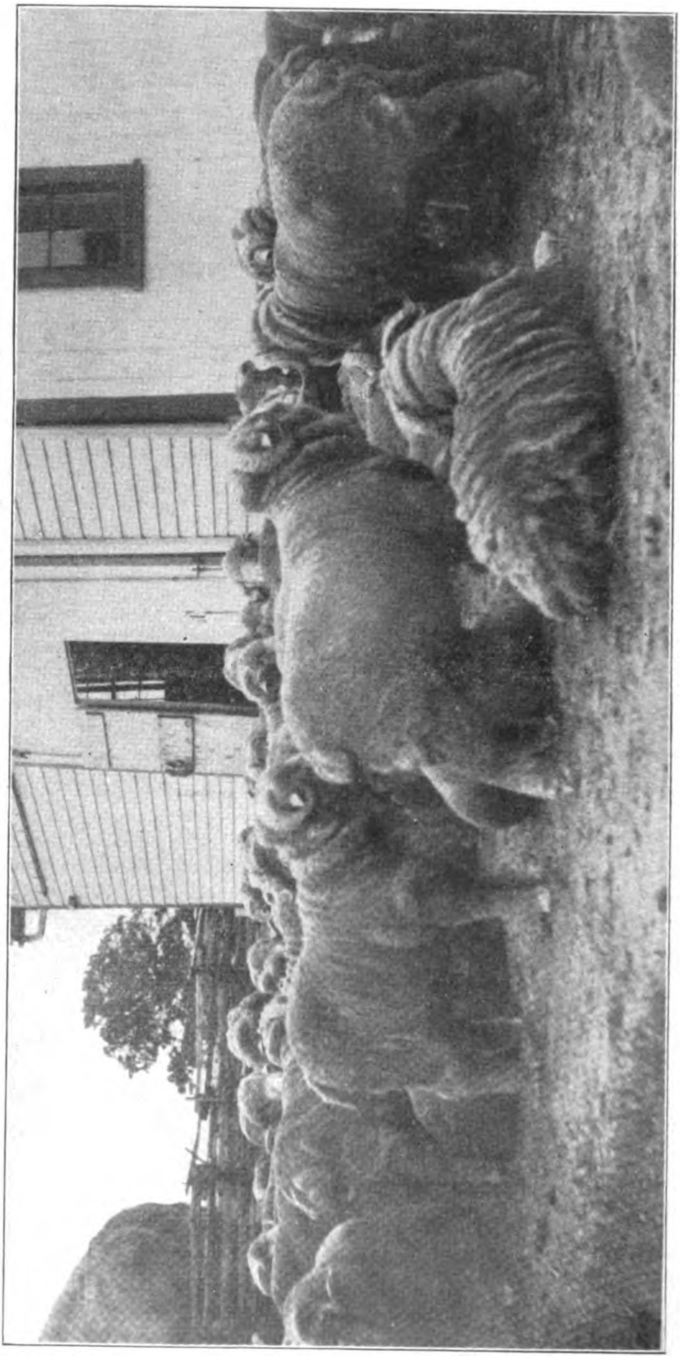

American Delaine Merino rams.

the wool and in many cases pulls it out. The fleece is left in a broken condition, which is objected to by the buyer, and it is not possible to tie it up in attractive condition. If the flock is badly infested with ticks, the good appearance of the wool is lessened by the eggs and dead bodies of the parasites, and their presence would lead the buyer to suspicion the condition of the wool.

The most common external parasites in farm flocks are ticks and lice. These can be kept down to a minimum by regular and careful dipping. As a rule it does not pay the owner of a farm flock to make the small quantity of dip necessary for his sheep, as the proprietary dips advertised in leading live-stock and agricultural journals can be had at less expense. Most manufacturers and agents of proprietary dips also handle the equipment necessary for dipping. In case they do not, they are prepared to refer to supply houses who keep such equipment in stock. To be most effective, dipping should be practiced twice a year. The whole flock should be dipped a few weeks after shearing, and again in the autumn before the weather is cold enough to make the wet sheep suffer.

On rare occasions farm flocks may be infested with scabies. The eradication of this parasite requires such care and observance of details that owners would do well to write to the Bureau of Animal Industry, Washington, D. C., for instructions. The Bureau has made scabies, or scab, a thorough study both in the laboratory and in the field amongst the large range flocks of the West, and hence is in position to give definite instructions for its eradication.

TIME OF SHEARING.

To a limited extent, the condition of the wool depends on the time shearing is done. The normal time for shearing farm flocks is from the middle of April to the middle of May, after the cold weather is over and there have been a number of days too warm for the comfort of unshorn sheep. As a rule the wool would be in better condition if shearing were done early, say about March 1st. This is true particularly of wool from breeding ewes. Where there are barns and equipment for keeping them comfortable, it perhaps pays to shear them before they lamb. Often a feverish condition immediately after lambing causes them to slip their wool, with the result that the fleece is broken and the amount of wool secured is less than if the shearing were done before lambing. Then, too, the growth of wool after lambing is likely to be weak, because much of the ewe's energy is expended toward the production of milk. Another argument for early shearing is that there are likely to be fewer dung tags. When sheep are turned on the fresh young grass in the spring, the dung becomes soft and inclined to cling to the wool. A frequent objection to shearing early is that the weight of the fleece is considerably lighter than it would be later on, because there has not been enough warm weather to cause the yolk (composed of oil and perspiration) to rise in large quantity. The foregoing statement is true, and since small lots of wool, such as are usually offered from farm flocks, are not purchased on the scoured basis—*i. e.*, the per cent of actual wool in the fleece shorn from the sheep—there is legitimate reason for not shearing until warm weather. Even if the wools in question were purchased on the scoured basis, another argument for late shearing would be consid-

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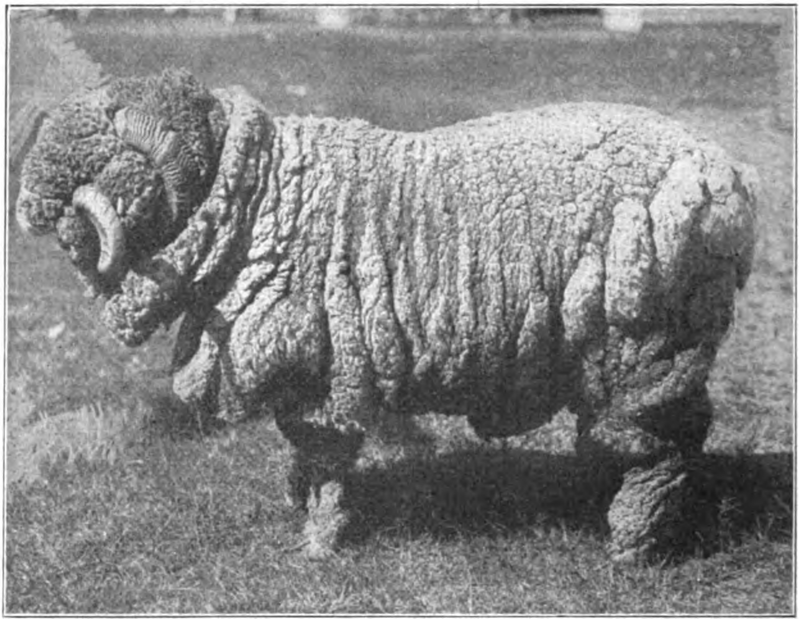
eration for the animal's health. This is an important matter in those sections where the spring season often is exceedingly variable and the shelter is not adequate for comfortably housing the flock. Because of sudden changes from warm to cold windy weather, shorn sheep are likely to contract severe colds, which may result in death. This is particularly true of sheep shorn by machine, as this process takes the wool off very close to the body.



A type of Merino ram raised in South Africa.

SHEARING.

Up to this point we have considered what the grower can do toward producing wool of desirable quality and condition. Granting that he succeeds in doing this, it is necessary for him to observe care in shearing and in packing for market, if his product is to find favor with the manufacturer.

The first requisite in careful shearing is to provide a clean place to do the work. A platform made of surfaced lumber is best, and it should be of sufficient size to insure that none of the wool will be crowded off by nervous, unruly sheep. For the amateur this platform will be none too large if ten feet square.

The second requisite is to cut the wool off smoothly close to the body. The power machine will cut closer than the hand shears, but satisfactory work may be done with the latter if the operator is careful and possesses some skill. It is the tendency of the unskilled shearer, whether using the machine or hand shears, to fail to cut close to the sheep's body. For example, the shearer may start to cut close to the body, but in advancing the shears he can not follow the shape of the animal, and hence some of the wool is cut from a half to an inch away from the skin. He can, and usually does, back up and cut close where he failed in his first attempt. This makes what is known as second cuts. Because they are so short they are of low value for manufacturing purposes. It is also obvious that the evil of making second cuts makes the fibers in the main body of the fleece shorter and uneven in length, and therefore less desirable.

The third requisite in good shearing is to get the fleece off the sheep without getting it torn apart. There is a knack in holding a sheep so it will not kick and struggle violently; if the shearer is fortunate enough to possess this knack, he is in fair way to have the fleece intact when the operation of shearing is finished. It is not our purpose here to describe shearing in detail, but perhaps it should be said that our most skillful shearers set the sheep on its rump while shearing it. Its body is tilted back towards the knees of the operator so that its hind legs can not get sufficient contact with the floor to make effective resistance. It is the adjustment of this position that amounts to the knack in holding.

Sheep should not be shorn when the wool is damp or wet, for when packed in this condition it will mold and deteriorate to such an extent that the fibers are weakened.

TYING THE FLEECE.

After shearing, the next important step is tying the fleece. Several things must be done to make this job a good one. First, all tag locks must be removed, whether they be of dung or grease and dirt. Second, the fleece should be carefully rolled up by hand (not in a wool box), with no ends and stray locks protruding, and with the flesh side out. Third, the fleece should be tied with a hard, glazed twine, not larger than one-eighth inch in diameter. In tying the ends of the twine especial care should be taken to make a firm, hard knot that will not slip.

The first thing mentioned with respect to tying involves packing nothing but merchantable wool in fleeces. Weighty materials, such as bricks, stones, and sheep heads, should not be rolled up in fleeces, and fortunately such instances are relatively few. But tag locks are so common that their presence in fleeces from farm flocks is the rule rather than the exception. The total effect of such a practice is bad. It puts our wools in bad standing with wool houses and manufacturers. Long continued, it has led to the only logical result; namely, discrimination in price against our wools.

Careful rolling, with the flesh side of the fleece out, and no ends or stray locks showing, adds greatly to the appearance of the fleece. It also prevents mixing the wool in different fleeces; and, by the way, each fleece should be tied by itself. In wool warehouses it is a pretty sight to see the heaps of graded wool faced with a tier of carefully rolled and tied fleeces.

TYING-TWINE.

The use of wrong kinds of tying-twine has caused the manufacturer more trouble than any other one thing with the wools marketed from the farms of the central and eastern United States. A hard, glazed twine should be used in order to avoid getting any of its fiber mixed with

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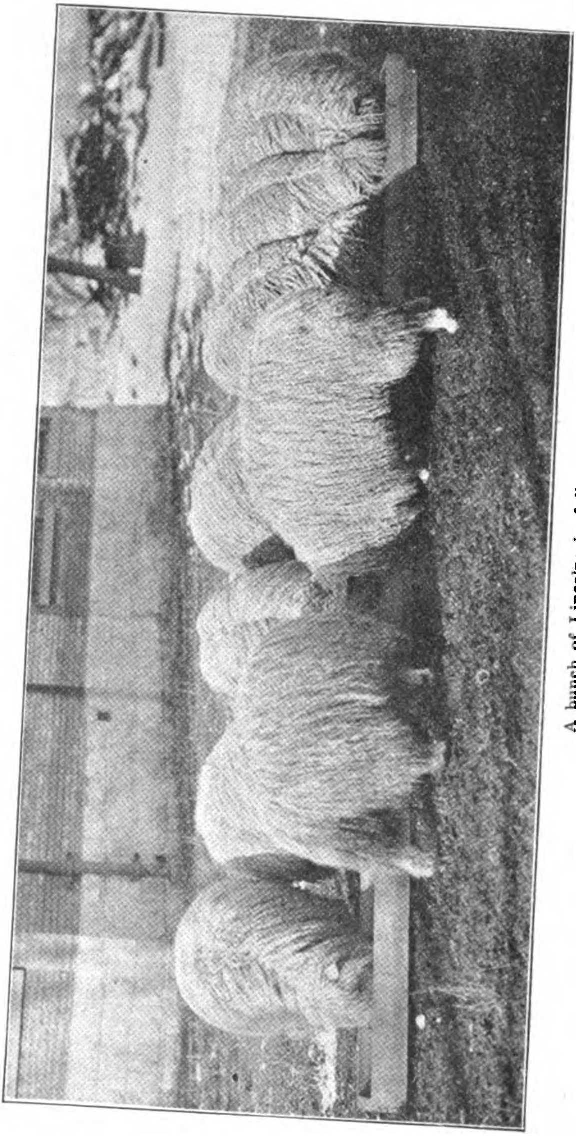
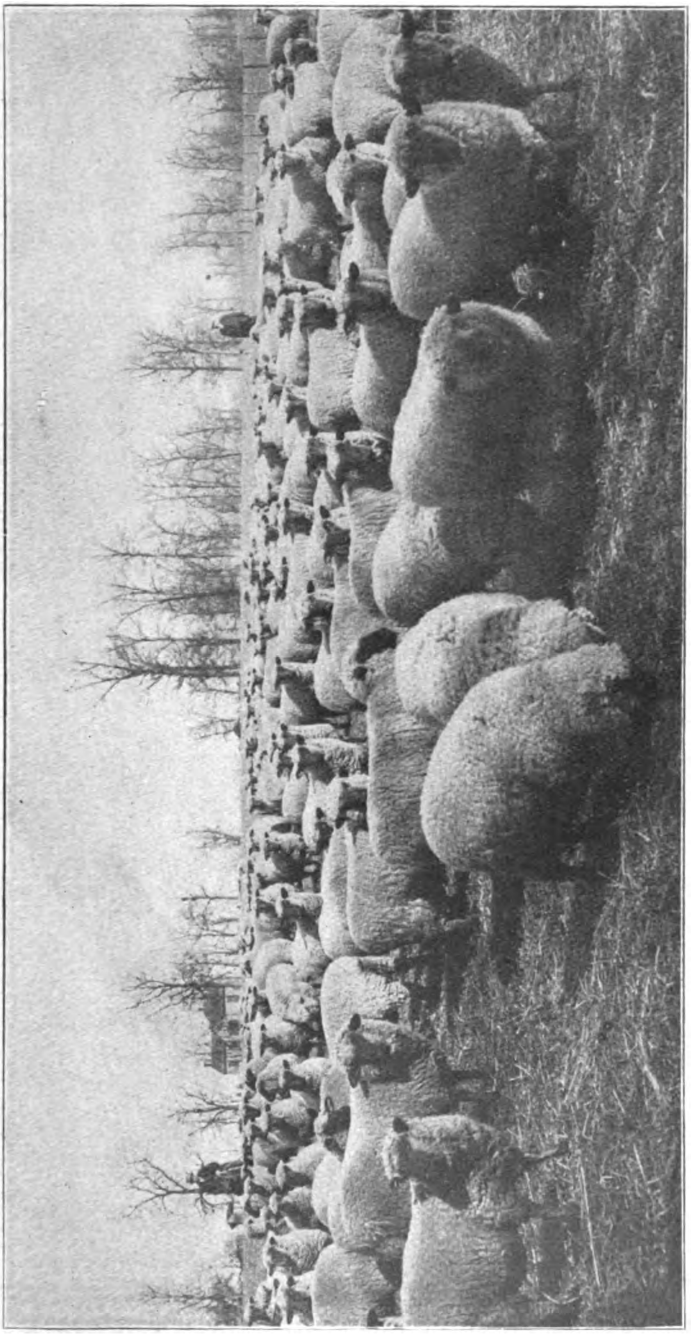


A bunch of Lincolns in full dress.



A fine flock of Hampshires.

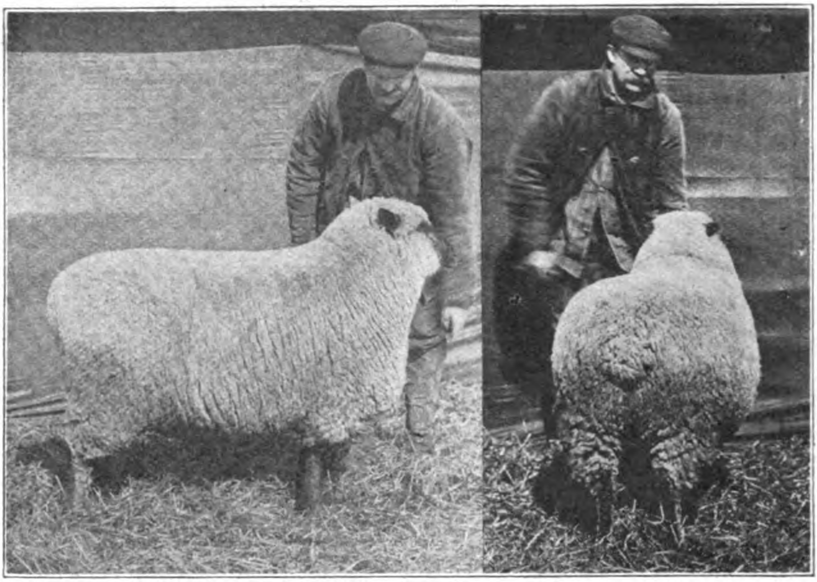


FIG. 3.—In the fleece.

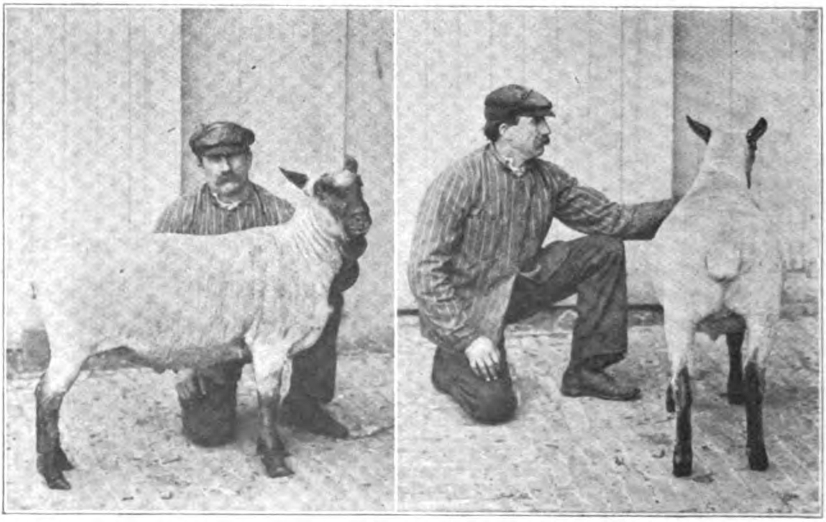


FIG. 4.—The same sheep as in fig. 3 out of the fleece, showing a good job of shearing.

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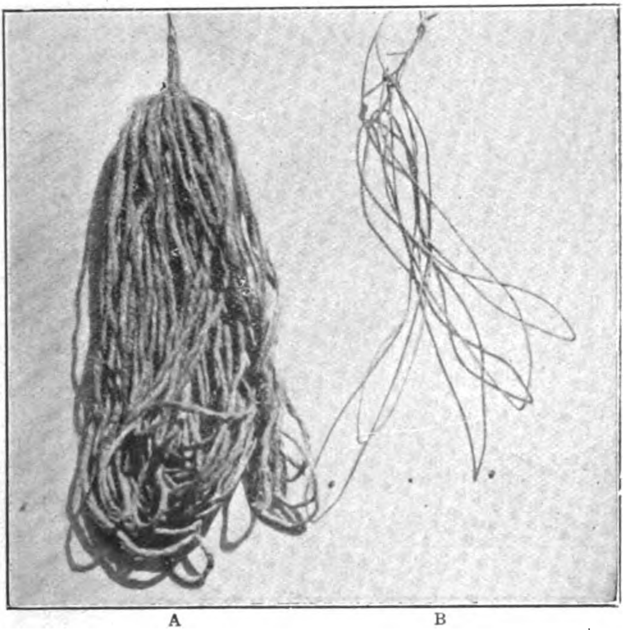
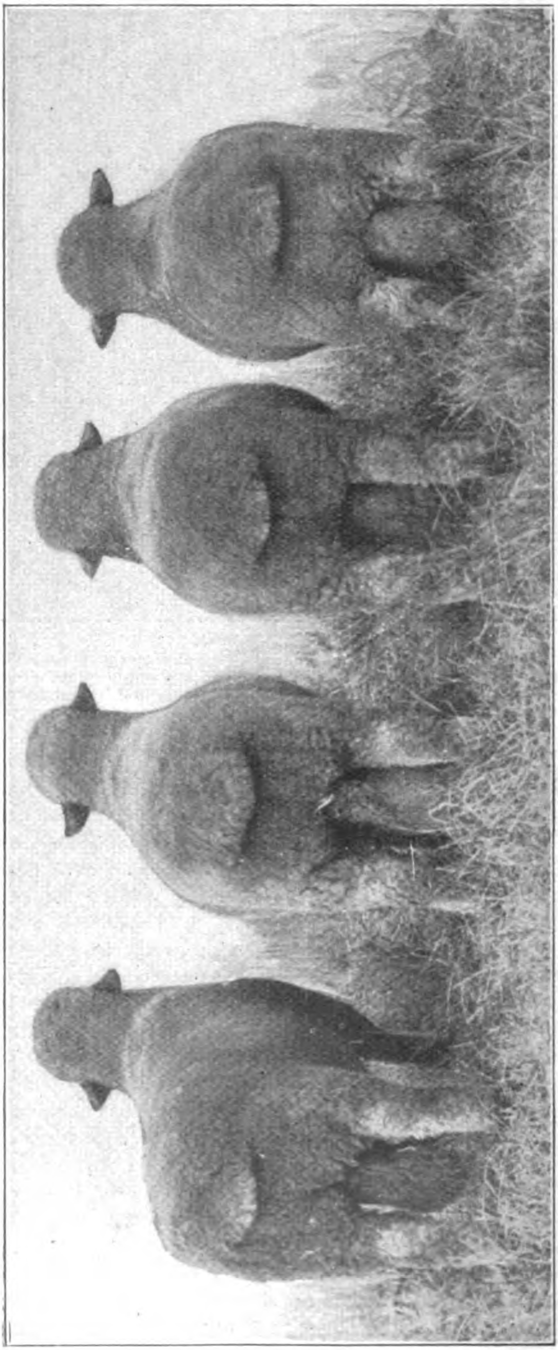


FIG. 5.—A, Ninety feet of jute twine weighing one-half pound, the amount taken from one farm fleece by a prominent wool house. B, Seven and one-half feet paper twine, all that is necessary to tie the fleece illustrated on page 439.

the wool. During the last three or four years paper wool twine has been introduced which is entirely satisfactory to the manufacturer. Rough, loosely woven twine made of vegetable fiber is not desirable, because some of the fiber gets into the wool. It is impossible to remove it. It will not take the dyes used in coloring wool, and it is detrimental to the strength and finish of the cloth. The only way to get rid of it is to pick it out of the finished cloth, which is an expensive process. Sisal twine is the most objectionable of all employed for tying wool. The mills have objected to it so strenuously that its use is being largely discontinued. In no event should it be used; better not tie at all than use it. There have been placed on the market jute products, called wool twine, which are not at all satisfactory. They are so loose and rough that many of the fibers cling to the wool and cause defects in the goods. Undoubtedly the wool trade the world over will institute a war against this type of twine. These so-called wool twines are also unnecessarily heavy. The best wool buyers object to excessive size and length of string. A well known wool house in the Middle West informed the writer that they had removed more than one pound of twine from a single fleece. The use of so much cheap stuff amounts to unfair packing. It is not necessary to wrap the string more than three times around the fleece—twice is usually sufficient—and the size of the string should be no greater than needed to give it the strength to stand the strain of drawing it in tightly on the



Hampshires, with good butt ends and backs.

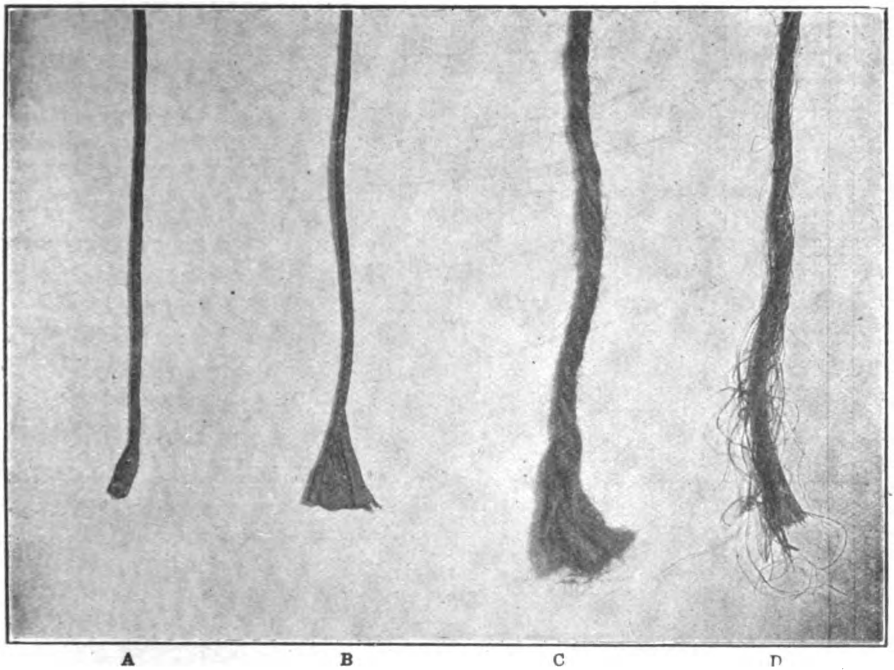


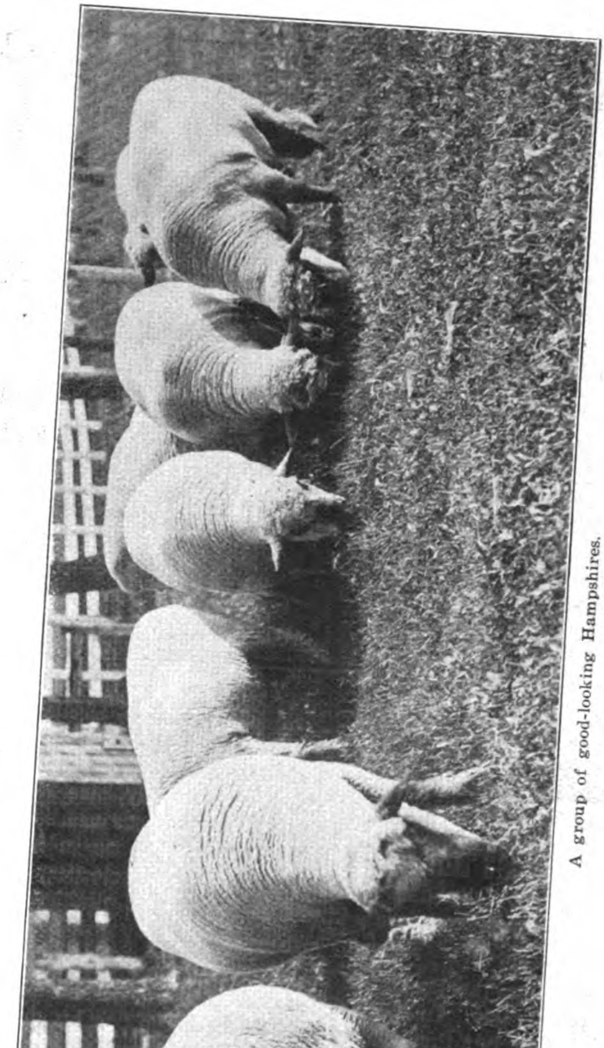
Fig. 6.—A, "India" size 4½, desirable twine for tying wool. B, Paper fleece twine, desirable. C, Jute twine, undesirable. D, Sisal twine, very objectionable.

wool for the purpose of tying. As stated above, it should not be more than one-eighth inch in diameter. "India" three-ply, size No. 4½, is a type suitable for tying wool; so are the paper wool twines. Some of the latter, however, are stiff, and therefore difficult to tie in a firm, hard knot that will not slip and release the wool. In selecting from them care should be taken to secure a kind that is soft and pliable.

PACKING AND STORING.

When packing, the fleeces of ewes, lambs, rams and wethers should be packed separately. In small flocks it is hardly advisable to pack them in separate bags, but they can be separated in the bag by sheets of stiff strong paper so that they can be easily sorted at the market. A bag containing a certain kind or kinds of wool should be marked so that its contents are known. Tags and wool from dead sheep should be packed separately. If there are black or gray fleeces, either they should be packed separately or their location should be designated. For example, a bag containing forty ewe fleeces, two of which are black, could be marked as follows: 38 white—2 black.

If the wool is not sold immediately after shearing, it should be stored in a clean, dry place. It should not be left on the bare ground, even though it is placed in bags. It is the better method to store and market wool in bags, as it is the more likely to be kept clean. The bags should be closely woven, so that they will effectively keep out dust and dirt.



A group of good-looking Hampshires.

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They should also be of a type that will not shed particles of fiber into the wool. The loosely woven jute bags commonly used are satisfactory in neither particular. In Australia the bags or sheets are lined with paper to insure keeping the wool clean. In England and Scotland the bagging or sheeting is made from selected fiber of the best long hemp, thoroughly scoured after weaving and carefully examined before it is cut up into sheets. We must exhibit the same sort of care if we are to keep pace with them in the quality of the product we offer for sale. If the clip is contracted for before it is shorn and immediate delivery is planned, it is not necessary to bag the wool unless at the request of the purchaser. If it is packed in a clean wagon box and a canvas is thrown over the top, it can be delivered in desirable condition.

The writer is fully aware that some of the preceding suggestions with respect to growing and marketing will appeal to the sheep owner as hardly worth while. Nearly all small clips are sold to local dealers, who oftentimes do not discriminate sharply in favor of wool of desirable quality and in good condition. The man who offers the good product is discouraged because he secures little if any more than his careless neighbor. We must admit the seemingly hopeless condition of his case, but it is not entirely hopeless. When the majority of producers in a community adopt and practice better methods, the chances are that something distinctly in their favor will happen. Some one will find them and reward them for the extra care they have taken. If not that, wide-awake, live producers will find the market that is willing to pay for careful growing and packing.

Early in this discussion it was stated that the type of wool produced by farm flocks in the central and eastern states comes in direct competition with foreign wools that are carefully grown and prepared for market. These foreign wools are so much better prepared for the needs of the manufacturer that we can not blame him for preferring them. It is said that worsted manufacturers can not use tags. If included in fleeces they must either resell them or stop buying fleeces, and many prefer the latter procedure. After buyers have turned in another direction for their supplies, it is not easy to draw them back, and we can not hope to have them look on our wools with favor unless we do everything possible to make of them what the manufacturer wants. Let us remember that any one manufacturer can not use everything in a "tumble jumble" offering of wool, and that he therefore dislikes it to the point of refusing to bid up for it.

In these days we, as producers of wool, are absolutely dependent on the market for the disposal of our product. The day of homespun is gone. The world supply of wool is limited to such an extent that we may be confident of receiving a profitable return on our wool crop if we only do our share in meeting market requirements.

"The greatest industry of Australia is sheep raising, mainly for the sake of the wool, but also in part, of course, for the meat. Australia now ranks second among the great sheep-raising countries, Argentina being first with 92,000,000 sheep, Australia second with 72,000,000, and

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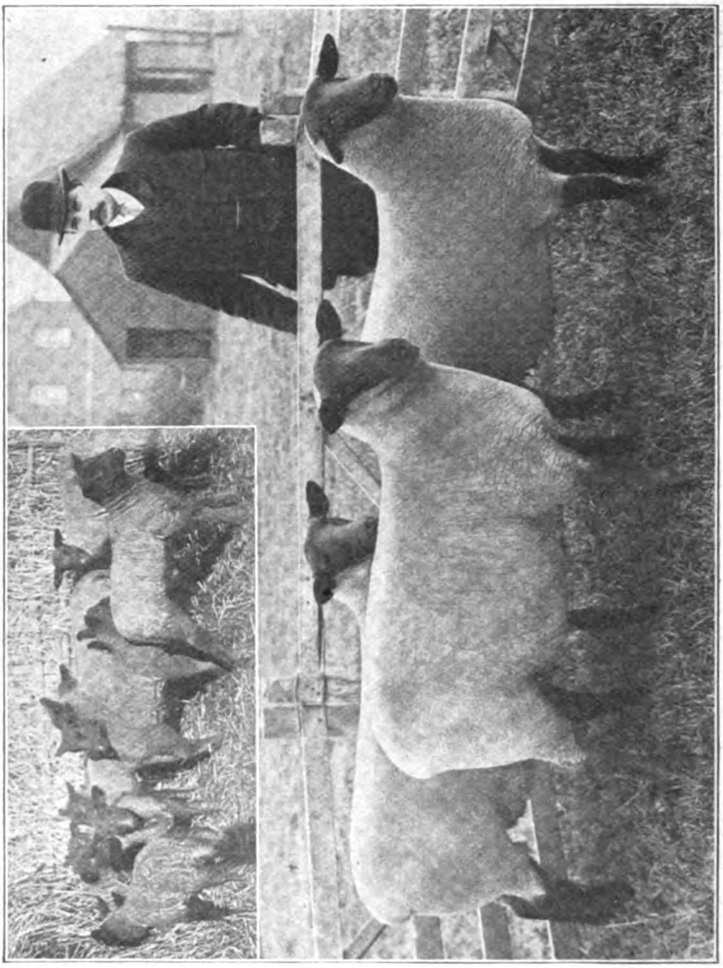

Trio of Suffolk wether lambs, 10 months old, weighing 651 pounds, winners of Prince of Wales' 300-guinea challenge cup, at Smithfield. In upper corner are shown Suffolk lambs three weeks old.

Russia third with 70,000,000. Only a few years ago Australia was first, possessing no less than 106,260,000 head of sheep. That was in 1891. Prolonged droughts were the cause of the destruction of many millions of Australian sheep, but since 1902 there has been an annual gain. Yet these sheep were not indigenous to Australia. They were first introduced in 1797, being of the Spanish Merino species."

ONLY A FLOCK—AND A DOG.

By Herbert Quick, in *Farm and Fireside.*

Somebody's dog 's killed my sheep to-day,
  Though they never did any dog ill,
And so they are done with their innocent play—
  Six, the last six, in one bloody kill!
No more shall I see them—my hope and my pride—
  Grazing in clover knee-deep;
I 've winked back the tears—see my eyes dry and wide—
  Somebody's dog 's killed my sheep!

I wish the dog's owner could know how I feel.
  Why, I nursed them like babes, those lambs!
Watched in the cold so sleepy I'd reel,
  And lame crouching down on my hams;
And the little soft fellows with innocent eyes
  Seemed to know how they 'd robbed me of sleep.
Now in death their glazed eyes show wild fright and surprise—
  Somebody's dog 's killed my sheep!

Thirty fine ewes of the royalest breed—
  Forty fine lambs at their sides;
Seventy fleeces to help out our need,
  A dike 'gainst the mortgages' tides.
Is n't it queer that the dogs some men love
  Will steal out at night while they sleep,
And turn into tigers and wolves as they rove?
  Somebody's dog 's killed my sheep!

Down in the village—I guess I know where—
  That dog is a baby's pet:
A boy's heart swells as he pats his head;
  But if he were me, you bet,
He 'd know the "nice doggie" that fawns at noon,
  To a shepherd 's a wild beast a-leap
At the throats of his flock 'neath the midnight moon—
  That boy whose dog killed my sheep!

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Part III.

Farm Poultry.

Pals.

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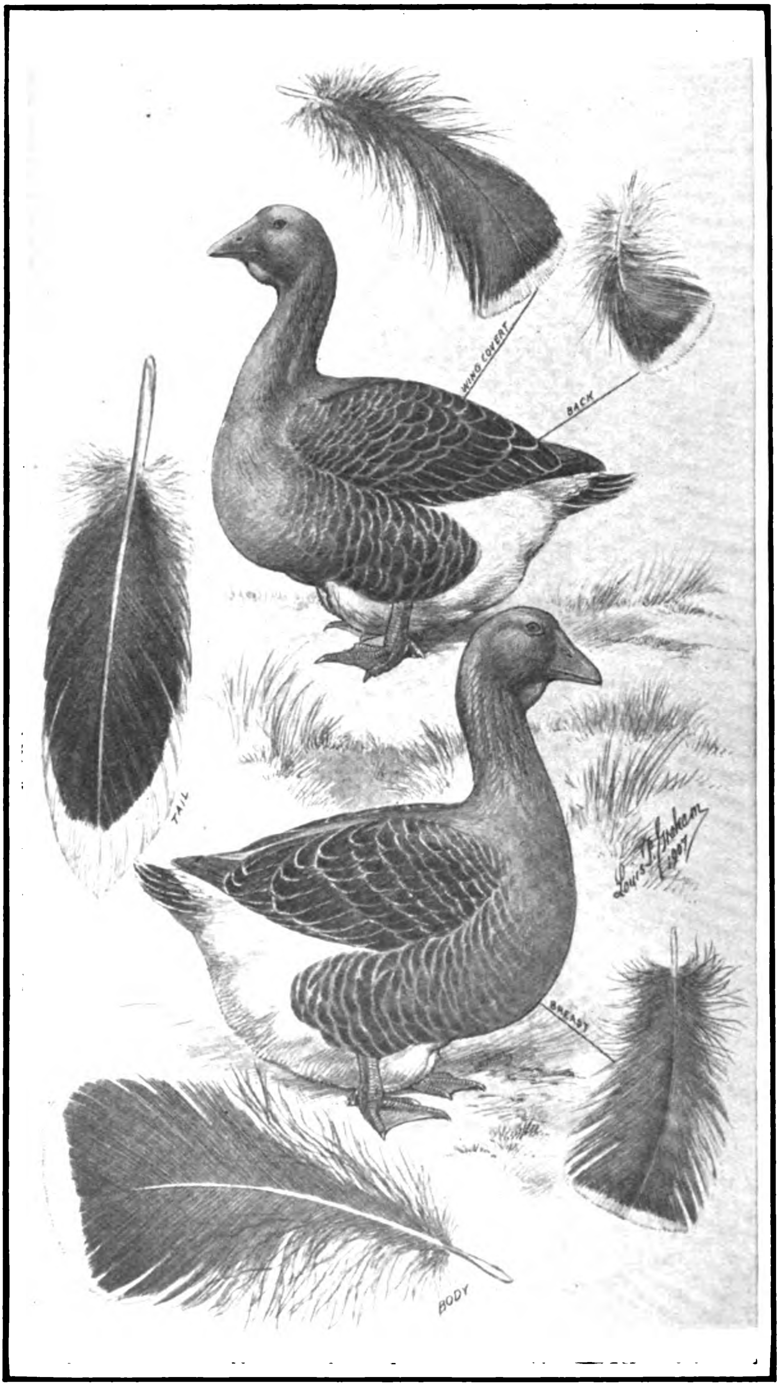

Toulouse Geese and Feathers.
From "Perfected Poultry of America."

FARM POULTRY.

THE HEN FEVER.

By Frances Willey, in *Little Farmers Magazine*.

Sooner or later every normal human being becomes a victim of *krowkackleitis*, a disease vulgarly known as "hen fever." It is usually contracted at the annual exhibition of the local poultry association, where its microbes fill the air.

The first symptom of this affliction is a yearning desire to own a few chickens. If the yearner is able to control his yearns, the disease soon runs its course and recovery is not only certain, but speedy. If, however, the malady is not arrested in its early stages it soon becomes chronic and is then incurable; for although it may not always rage with violence, and may have seasons of abated force, its paroxysms are sure to return with each recurring visit to a poultry show, while the sight of a coop of birds on an express wagon is usually quite sufficient to bring on a relapse.

It is to the novice in poultry culture—to the one who has been thoroughly inoculated with *krowkackleitis* and has passed into the incurable stage of the affliction—that these lines are addressed; for that one is on dangerous ground, and if he permits himself to be allured by misleading statements in the poultry journals, if he gazes too long at the vivid pictures of get-rich-quick experiences, if he accepts as facts the lurid tales of $1500 profits in poultry on a forty-foot lot in a single year, if he swallows the announcements of all the sales of fancy birds at fabulous prices, if he lingers at too great length over the oft-repeated fiction of a net profit of $5 to $10 per annum on each hen, he is hopelessly and irretrievably lost.

To the young man or young woman who seriously contemplates engaging in poultry culture, a few *don'ts* from one who has learned the game and has neither "axes to grind" nor eggs or fowls for sale should be of interest if not of value, and they are given here in the hope that they may save some of our readers from falling into very natural but costly errors that may easily be avoided:

1. Don't make the mistake of trying too many breeds. The Silver Spangled Hamburg is a beautiful bird; the Light Brahma is a gigantic fowl; the Leghorn is a prolific layer; the Orpington is a splendid economic breed; but if you are not better equipped than most beginners to keep Hamburgs and Brahmas and Leghorns and Orpingtons apart, you will be surprised and disgusted to note what a measly product comes from the amalgamation of even two breeds of thoroughbred birds. Better no fowls at all than more than one breed at first. The beginner will find that a single variety will cause him all the anxiety and trouble he

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wants to take on in the first year of his poultry experience. The second year he will probably know enough not to quadruple his vexations by the addition of even one other variety.

2. Don't expect too much of your flock. Of course you have read of "Lady Eggstacy," and how she laid 240 eggs in one year, and how her eggs for hatching sell for $5 each. But believe me when I pledge you my word that the 240-egg hen always lays her fruit in the poultry journals, never in her owner's nest. If you believe the tales that are told about these hens you will have to believe that they lay far more than 240 eggs a year, because you will soon learn that their enterprising proprietors have become very wealthy selling eggs from a single old hen as the result of what is sometimes called "judicious advertising."

3. Don't try to make your hens lay 240 eggs per annum each, but try to make them produce half that number, at a cost of half what you can get for the ten dozen each ought to lay. Economy is the lesson to study, and when you have learned it well you will understand what the poultry industry promises to the average citizen engaged therein.

4. Don't waste the "by-products" of your flock. Even the bones of the birds used for your own table, the feathers they shed, and, above all, their droppings, are of value, and the saving of them can be secured with but little effort, if a good system to that end is adopted and adhered to.

5. Don't neglect your birds. "Eternal vigilance is the price" of healthy poultry, and the other kind is n't worth any price at all, for it is n't fit to live, and the killing of such birds is neither pleasant nor profitable. No self-respecting hen will lay eggs in a nest befouled and no self-respecting dealer would buy eggs laid in such a nest. Clean your nests and you won't have to clean your eggs.

6. Don't hope to get rich from poultry in a minute. The man who does that accomplishes it as the result of a successful gamble, using his chickens as chips, as in a game of poker. Any man who receives $1500 for a specimen of poultry is a bluffer. Any man—or woman—who pays it is a fool. You don't want to be one or the other.

7. Don't reckon on the sale of birds or eggs at fancy prices. Pin your hopes to sure things. It should not be difficult to realize a certain dollar profit from every hen you keep—a hundred hens a hundred dollars —a thousand hens a thousand dollars. This should be safe reckoning; but it is a big job to get and care for a thousand hens, and you will certainly have to care for them before they care for you.

8. Don't dream. The poultry business is no dream. If you can raise show birds and sell them at show-bird prices, you do well; but it will serve your purpose better not to make too much sacrifice in the hope of capturing the ribbons. If you are intending to make a business of showing birds you need an equipment entirely different from that required for the commercial poultry business, and you will be wise to bide your time and see if you have the peculiar qualifications required for that branch of the work.

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THE ADVANCE OF POULTRY.

By C. W. Whitney, in *American Poultry Advocate.*

As the American eagle stretches its wings from the Atlantic to the Pacific and from the Gulf to the Behring Straits on the north, so does the American hen give her product to increase the wealth of this same great expanse of territory and to feed its people.

Truly it may be said the American hen is the soul of the country's greatest agricultural industry, for though it may be exceeded in money valuation of output by corn and cotton, it is not exceeded by either of these in value to the populace of the nation, if that value be figured from all points instead of from the view of money valuation only.

The statistics given us by the United States Department of Agriculture place poultry third, corn and cotton exceeding it in value. Poultry is so close a second to cotton, however, that if the figures were to embrace that of the total amount of poultry raised in this country by the small city lot and village poultry keeper, then they would far outrank those of cotton and place poultry a near competitor for the supremacy that is now held by corn. I hope that the next census taken, in which the gathering of figures on poultry have a part, will be of more real worth to us in determining the actual value of poultry in this country; it is possible that they may be so, and we as poultrymen and women should use our most earnest endeavor that they will be. The value of the poultry raised, kept, and of the product consumed from these small poultry plants, is far more than realized.

To my best belief, we may assert to-day that the industry of which we are representatives, whether we be small or large breeders, is a billion-dollar one.

Old as it is, the industry is still only in its infancy. This is due to the fact that no really organized effort toward educating the poultry keepers in the how and why of getting more out of their fowls was attempted until within the last decade. Twenty-five years ago the poultry products of this country were gathered from the flocks of farmers. There were but few, comparatively, who made a specialty of raising poultry for any purpose. To-day specialty poultry farms and plants are on all sides of us, and still the demand is nowhere near met, and neither will this consumption of the product of fowls be met for years to come, if ever. The demand is increasing faster than the product.

The business of raising poultry is older than the Christian era. The science of poultry raising, the business of raising poultry for a substantial profit, is younger than almost any of us. Poultry keeping is old as an art, new as a science.

The fattening of poultry for eating is over 4000 years old. Tablets have been found in the pyramid of Sakkara that gives evidence of it being carried on in connection with the preparation of geese for eating by the Egyptians at that period. Roman writers show that the fattening of poultry for this purpose was practiced in Italy 2000 years ago.

Artificial incubation was known to the Egyptians 2000 years ago. Not long ago a metal stamp was found in an old tomb of that time on which was a stamp of a chicken very much in likeness to the Egyptian fowl of now. The United States consul at Cairo, Egypt, tells us that the industry of incubation of chickens in large numbers at central points is an old one; that this art has been known to those people for so long that the hen has forsaken this part of her work and left it to man for all time to come. The population of Egypt is very dense; there are nearly 7,000,000 people in that land, whose chief diet is fowl. Nearly 45,000,000 eatable fowls are consumed annually by this population, and even that great amount is not an over supply. Hatching is an art in Egypt; its secrets are prized and handed down from father to son through the generations. The months of February and March are most used for this, at Easter it is hot and the work must be nearly over. Incubatories are found in villages which are central points for a section of territory. They are massive in character and turn out every season from 300,000 to 600,000 chicks, that are, within forty-eight hours after hatching, sent out over the country.

We know little of the origin of the first fowl, but one spark of knowledge has been handed down to us through the ages. It was a game—not a game as we see them to-day in our shows, but nevertheless a pure and noble fowl. There is no doubt but that this game is the only actual pure fowl. We can trace it back to before the Christian era, back into early Bible times. I have never heard of there being a record of the beginning of this fowl. The earliest of Chinese records mention cock fighting. In India there are notices dating back to 1000 B. C., and the Persians practiced it for centuries. Cock fighting has been traced back to the Phœnicians, and it is said by Jewish authorities that the Assyrian war god Nergal was symbolized by a fighting game cock.

The earliest record we have of fowls in an English-speaking country is that of the Roman invasion of Briton (now England). It was they who introduced cock fighting into Briton, though they found there a fowl of markings similar to the English Dorking. This was in the time of Cæsar. It was he who said, "The Britons kept fowls for pleasure and diversion, but not for fighting." The Romans had long been eaters of fowl and also introduced this into England. Previous to that the Britons did not eat fowl, it being unlawful.

In later years the game fowl in Briton was developed into the exhibition game, which has since undergone many changes, principal of which is the elevation of its station. So far as I have been able to learn, the Dorking is the oldest meat fowl. Just how far back this dates it is impossible to say. History begins with it in Briton in the time of Cæsar and makes no record of the years before or of where the Romans obtained their meat fowl, which was very similar to the Dorking.

History now fails us, and we are unable to learn much of interest until in the Eighteenth century. All the earlier attempts at artificial incubation outside of those of the Egyptians were made in France.

In 1540 Francis the First, monarch of France, became interested in

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the subject. In 1777, at the time when the Revolution was occupying the minds of the then young American colonies, a Doctor Bonnemain constructed an incubator in France. It was quite successful, and supplied chickens to the Paris markets and to the court of France. All this came to an end with the events of 1814. Reaumer obtained some results from the heat of fermenting manure heaped around casks. In 1845 M. Vallee, a Frenchman, introduced, crude as it was, the self-acting valve that, though improved now, is still the basis of all temperature regulators on incubators of every manufacture. In 1846 Cantelo introduced the supplying of heat from above. The tank system was introduced by a Mr. Carbonnier. Improvements now followed in succession, the end of which is not yet, for with each year we see some new improvement in American machines. It appears that the first American incubator was built in Boston by the firm of J. Graves & Company, in 1870.

But to return to the fowl history. In 1865 the first Standard of Excellence came out in England; this was followed by one on this side in 1872. Apparently in the foregoing years there had been a continued improvement in fowls, and breeds were in creation.

Of the varieties with which we are the most familiar, the Minorca first came from the island of its name in 1830; the Leghorn, of Italian origin, in 1835; the Brahmas, probably of American origin, the two varieties coming from distinctly different origins, in 1852. There is no doubt but that the Light Brahma came from the China fowl brought here from China in this same year. The Rocks, of pure American origin, made their bow to the public in 1870, and have never left the limelight; the Wyandottes came on the scene of action in 1875, and like their sisters, the Rocks, were purely American. One after another, breeds have fallen into line during these later years of our own memory. I do not need to dwell on this longer than to say that of all the breeds there is little doubt but that the White Face Black Spanish has been the longest known of all breeds. This fowl stands at the head of the Mediterranean group that it is almost sure came to us from the Spanish Peninsula around the Great Sea. In Greece, in Asia Minor, in Italy, and in Egypt are traces that give us all the necessary evidence. I said earlier that the Egyptian fowl had abandoned the art of incubation. This is true of all those who come from around the Mediterranean Sea, and is probably due to one of two things—the loss of the instinct through artificial incubation, practiced for ages, or through the prevalence of the Roman Catholic religion, which there forbids the use of the fowl's flesh for eating and only permits the eating of its eggs.

A comparison of the Standards of Perfection of this country that have been issued no further back than ten years, show plainly the evolution of the domestic fowl. Not alone in type is this to be seen, but also in the requirements that must be met by the modern fowl of this day. Just where this will end it is impossible to say; nature's laws alone will arrest the mighty movement now on foot to get the most from the little body of the hen. We ask her now to give us five and one-half times her weight in eggs every year, and we strive to create in her a desire to meet our wishes. I say to create a desire, because no man can drive na-

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ture to do his will; he can only endeavor to make nature willing to gratify him.

It is only within recent years that the agricultural colleges have adopted the study of poultry culture in their courses. In 1885 the first bulletin on poultry in the United States was issued. At Cornell in 1893 there was given the first series of lectures on poultry, and in 1898, at Rhode Island State College, the first class in poultry husbandry was held. The summer-school short course was inaugurated at the Connecticut Agricultural College. These marches on the road of education in poultry keeping have now sent out their influence all over the country, until from a minor branch of agriculture, poultry has become one of the chief branches.

The changes have been brought about by increased knowledge and its application to every-day practice. Poultry culture had narrow walls of limitations until science stepped in and released it from its bounds by aiding in solving the problems of breeding, incubation, feeding, etc. Thus have scientific principles come to dominate poultry keeping in a great measure; to them we must bow or court inevitable failure.

Knowledge is a greater asset than finances in the poultry business. With the former you can succeed in the face of almost any reverse; without it you can not succeed even though you have thousands at your disposal.

There is no business in which honest endeavor plays so important a part in success. Try poultry keeping in this way and the truth of this statement will come home to you with greatest force.

Where shall we place the credit of the evolution of the poultry business? To organized effort—the effort of the fancier to produce a more perfect fowl; to the poultry exhibition where he could show that fowl and thus create demand; to the agricultural colleges and other educational institutions that have made it possible by study to improve this perfect in type and plumage fowl in utility production.

Are these all the sources of improvement? Not quite; there are the American Poultry Association, the state poultry associations, and the local poultry associations. All of these have cast in their mite, and particularly is this true of the state poultry associations of some of the states. The state branch of the American Poultry Association made possible the appropriation of $90,000 for the poultry department of Cornell, at Ithaca, N. Y. The Connecticut Poultry Association lends its voice in obtaining the $25,000 appropriation in Connecticut, and thus it has been and is being more and more all over the country.

Local poultry associations are holding meetings and state associations are aiding by furnishing speakers. The holding of large poultry conferences is permitted through the state association. In all of the advancement of the poultry industry, which advancement materially helps every one of us, is helped by the state association, the national and the local.

They are accomplishing so much that every poultry keeper should gladly join forces with them and by membership coöperate and assist. Let me be so immodest as to refer to the state association of my own

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state. I know its work better than I do the others. No doubt others are doing as great work. I hope so anyhow. The Connecticut Poultry Association is exerting an influence that is felt in every part of our state. It is an influence that will be felt more and more as the years pass, for it is elevating poultry and poultry products in Connecticut. It is furnishing speakers for all kinds of agricultural gatherings where poultry is a topic; it is holding assemblies; it is distributing to poultrymen seals that assist in the sale of their product and create a demand for that product, because they are seals of guarantee that the product is fresh and good; it is helping the poultry shows by cash prizes. There is no avenue for improvement it is not at work upon.

And so the work of progress goes on. Poultry organizations are growing; school poultry clubs are being formed in public schools; states are advocating the study of poultry culture and giving generous appropriations to aid such, and last, because most new, though to become a powerful factor in educating the city poultry keeper, is the Y. M. C. A. Progress is the watchword, education the password, that permits us to enter the ranks of successful poultry keepers. There is one law that applies to all—the law of application. Concentrate the effort, and success is the only goal. Let the mind dwell on the principles that have in the past made the poultry industry all that it is. As success has been by the study and application of scientific principles in poultry keeping, we should follow this course. Scientific poultry keeping is a live, actual fact, not a mere idle theory. It is the chisel that is shaping the destiny of the industry.

I will close with just a word from the pen of Professor Rice, of Cornell University:

> "What the development of the domestic fowl is to be will depend upon two great controlling factors—her environment and her keeper. The former includes the soil, food and climate, and the latter man's intelligence, enterprise and education. These two factors are interdependent, each reacts upon the other and both react upon the fowl. The hen is largely what the environment and man make her. Creation has only begun.
>
> "In the domestic fowl we have a good foundation upon which to build. Our environmental conditions are unexcelled. Hence, what the domestic fowl of the future is to be will rest with man. A large responsibility lies with each of us to do our part in improvement. This is our reasonable obligation."

It is only by bringing every individual in the flock up to at least an average of 140 eggs a year that we can hope to get poultry rearing on a paying basis. That many flocks are doing better than that is being proven every day. That many fall far below that average on the farm is deplorable. But it takes more than egg-laying ancestry to get a flock up to a high standard of laying. No hen can produce her greatest number of eggs without proper feed, care and housing. But she will do her part if you do yours. A good hen is like a good machine, she needs intelligent handling to keep her machinery in good running order.—*Jennie E. Stewart in Green's Fruit Grower.*

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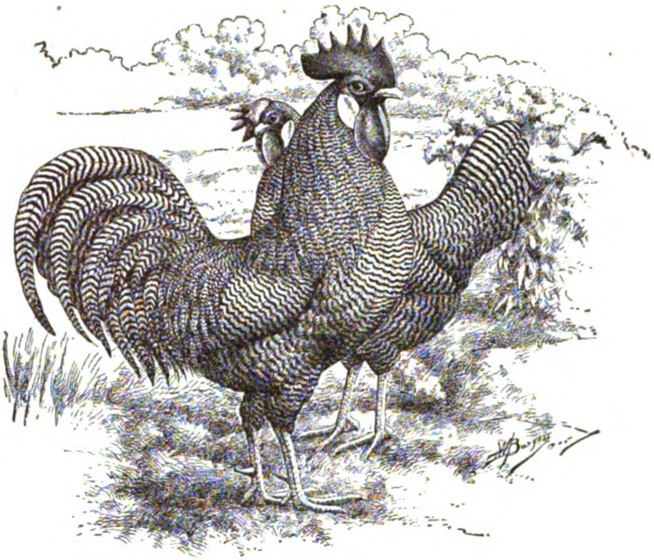

A pair of Dominique Leghorns.

POULTRY COMPARED WITH OTHER PRODUCTS.

From *Poultry*.

We seemingly fail to realize just how profitable a flock of poultry may be under certain circumstances. At certain seasons of the year a farm flock of poultry will almost keep itself by consuming fallen grain or that which is shattered in bringing the grain from field to granary.

Very frequently a flock of poultry which is kept in an orchard will so completely keep injurious insects in check that the improvement in the fruit crop is worth in money more than the flock costs in the entire year.

It would not require very good management to keep fifty fowls in good health on an acre of land, nor would it require extraordinary skill to make these hens pay a profit of one dollar each above the cost of the feed they would consume. To keep two cows on an acre of land, and secure from them a return of twenty dollars above the cost of the feed, would require very good cows and very careful management.

The hay from an acre of good meadow would be worth twenty dollars, if we allow two and one-half tons to the acre at eight dollars a ton. To secure this would require considerable hard work on the part of man and team. To secure fifty dollars from an acre of hens would not cost any more labor, the labor would not be so hard, and the returns would be at least 150 per cent better.

Fifty bushels an acre is a good yield for a crop of corn. To secure this the farmer must work from early spring until late in the fall. He must plow, harrow, plant, cultivate, harvest and take to market and in the end he will have twenty-five dollars with which to pay himself for all the work he has done. The man who has fifty hens on an acre has fifty dollars to pay him for less work and less risk than the corn grower has taken.

Compared with any other branch of agriculture, poultry is able to make a showing which dwarfs the product to which it is compared into insignificance.

THE BEGINNER IN POULTRY CULTURE.

By Mrs. Mattie Webster, in *The Poultry Tribune.*

The experienced poultry raiser can easily trace many of the ailments and the unsightly appearance of the fowls to the ravages of lice and mites; but the beginner in the work seldom attributes to these pests the disease and death that sometimes so discouragingly depletes the flock. Now do not think it is an exaggeration of the possibilities of evil of these tiny torments, and carelessly allow them to "increase and multiply" in the houses and quarters of the fowls and chicks. If the poor biddy that died on her nest, trying to the last to faithfully do her duty, could have rehearsed her tale of suffering before death brought happy release, her owner would no longer doubt the truth of the old, old story of the misery and distraction wrought by lice and mites. Many poultry raisers—farm poultry raisers especially, who are not interested in "fancy birds"—will tell of sickness among the fowls; nonlaying hens, and contrary biddies that break eggs and will not attend well to the business of incubating the eggs placed under them, and ask for a cause for disease, unfilled egg baskets and the behavior of Mrs. Biddy. When told that lice or mites, or very probably both class of pests, are the authors of the whole list of failures, ten chances to one the disgruntled breeder will declare there are no lice or mites in his, or her, chicken houses. Be sure you are right about the absence of these pests from your chicken quarters before you spend time trying to locate the cause of disease and unprofitable biddies. These workers of ill do their work very quietly and in the dark. The mites are content to get in their deadly work during the hours of night, draining the very life blood from the birds while they are trying to sleep and then going in hiding during the day. One must look very closely, unless the place is alive with them, to discover there are any present. Their favorite hiding places are beneath the perches where they are resting upon supports, in cracks, and in the hiding places in nest boxes. Lice are with the poor birds by night and by day. They hide in the feathers, especially around the head and neck, under the wings, and around the vent. It is a tiresome, fierce fight to get rid of the pests after they once get a firm "foothold" in the houses and quarters, but better such constant effort than to endure their presence. Few if any lice or mites will be found in the house that is kept free from filth and is often treated to a dose of whitewash.

We have commenced our fall poultry-house cleaning; have one double house all nicely whitewashed, the floor all cleaned off and ready for the new layer of fresh garden soil, and everything in the house sweet and clean. Thought there could not be a mite in this house, as droppings are

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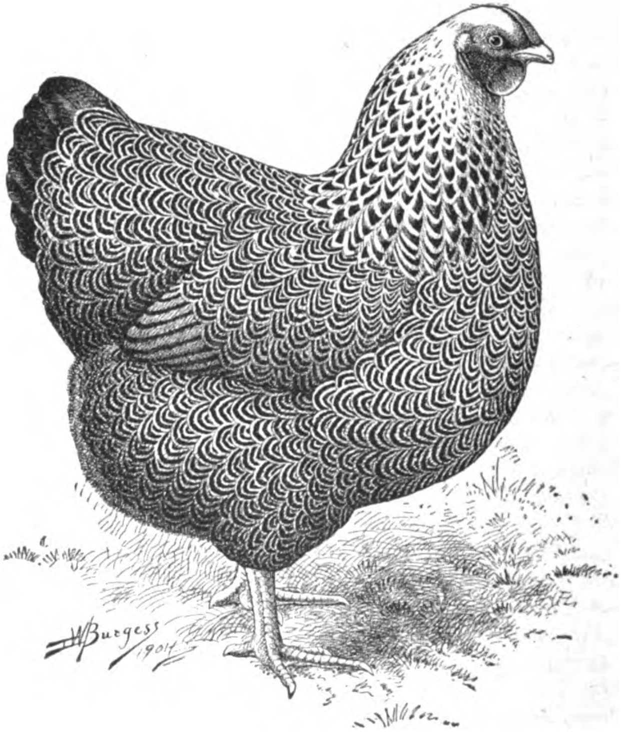
removed once a week and everything else possible done to keep them in abeyance, but a very few were found where the perches rested upon the support. We were glad when we saw the pests that we had not deferred the commencement of our annual cleaning until later. We made it just as "unhealthy" for them as we possibly could, and murdered them with hot whitewash without any twinges of conscience. Whitewashing rough boards is not the pleasantest or cleanest work of the poultry breeder, but it is one of the most necessary and effective of the breeder's tasks. When I get through a day's whitewashing I certainly am well bespattered with the wash, and oh, so tired, but the well-satisfied feeling of good accomplished well pays me for it all. After thoroughly cleaning such houses, the birds to occupy that house are well dusted with insect powder before they are allowed to enter their nice, clean homes. If one can eliminate lice and mites now, after the hot weather has passed, there will be little trouble in keeping the houses free of them until the coming of summer weather again. Cleanliness is one of the first and greatest requisites in poultry raising. Be sure the most scrupulous cleanliness prevails, then, with other needs supplied, the fowls will be healthy and profitable.



A Silver-penciled Wyandotte hen.

CHOOSING A BREED FOR UTILITY.

By Arthur L. Poor, in *American Poultry Advocate*.

As there are more than one hundred different breeds of poultry given in the Standard of Perfection to choose from, this matter of choosing a breed for utility would at first thought be a hard problem to solve. There are, however, in this large number of breeds a few varieties that are more common, which are more known to the people in general and stand out far ahead of the larger majority of breeds which are used only by fanciers to exhibit in the large shows.

In choosing a breed for utility alone one would hardly think of selecting a variety that was not popular and widely known in the section in which he lived. The few breeds that stand out above the others are the Plymouth Rocks, of which we have the Barred, White and Buff; the Wyandottes, we have the White, Buff and Columbian; the Leghorns, we have the Brown, Buff and White; the Orpingtons, we have the White and Buff, and the Rhode Island Reds. In this list will be found enough varieties to suit anyone that likes poultry and wants to keep it for the returns it will give. You will notice I did not include the Black varieties in my list, because when dressed they will, if not thoroughly dressed, leave dark pinfeathers in their skin.

To succeed in the poultry business at the present time it matters not so much whether you have a liking for poultry as it does the business ability that you would use in the caring for the hens. To use the same ability that you would in any business, to involve the same study and the attention to little details, you would find poultry keeping a profitable enterprise to engage in.

To the person who only intends to keep a few hens in his back yard just for the table and as a hobby, the subject of a choice of a breed might be different than with those who intend to go into it more heavily and make it their regular business. To the one who only has a few hens in his back lot, and has table scraps to feed them, almost any breed of fowls that he might choose would pay him a fair profit, because they would not eat as much grain and would lay well on the table scraps. On the other hand, those who intend to keep poultry as an extensive business, and have to buy all their grain and everything the hens would eat, would have to select a breed that is known to be the most profitable.

A large per cent of the people in the New England states choose the American class. This is mostly due to the fact that they ship to the Boston market and that Boston people prefer brown eggs over the white eggs which the Leghorns lay.

The American class of poultry is a general-purpose fowl, which makes the best four or five-pound roasters; they are fine layers; in fact, they lay very nearly as well as the Leghorns, but require more care to get the same results in eggs. They will sell for one-half more than the Leghorns at the end of their laying season in the fall, but they will cost more to raise and cost about one-third more to keep them one year, which will be more offset in cost than the low price that the Leghorns sell for.

Because of the extra cost to raise the larger fowls and the more floor space which they would really require, it would necessarily mean a larger capital to start with.

In the general market the brown eggs will sell for one or two cents more than the white eggs, but you can afford to cut one cent per dozen on the Leghorn eggs, because you can produce them so much cheaper.

Generally speaking, those who raise poultry on a large scale do not care to raise more than enough to replace their laying stock, and find it hard to do that sometimes. If you keep the Plymouth Rock or Wyandotte and raise enough pullets to replace the layers in the fall, selling the roosters as roasters and the yearling hens to market, and considering you have a fair egg yield, you will at the end of the year make three times as much from the sale of your eggs as from the sale of your poultry. This will show that the eggs are the principal profit in poultry keeping and that the market side is a by-product or a necessary side line. If eggs are the most paying part or the utility side of poultry, we should make eggs our specialty and not have more market poultry on our hands than is absolutely necessary to produce the required laying stock.

The fowl that will come nearest to this standard is the Leghorn, and it is an absolute fact that, for the cash invested and the time and labor needed in taking care of them, there is not a fowl that will bring in a larger net return to the person that has no special market to ship to, but ships to a commission house.

But, you say, why are there not more Leghorns kept? The reason for it is that people will not accurately compare the results of the Leghorn with those of the larger fowls, and that they would rather spend longer hours caring for the larger fowls than to work around the nervous Leghorns, as they so often call them.

Perhaps I have been a little one-sided on this subject, but I have tried to state the facts of the case, and if more people would start in the poultry business with Leghorns there would be fewer failures.

On the other hand, if a person has made a choice in one of the American class and intends to stick to that one breed, he would make nearly as much as he would with Leghorns. He would necessarily have to begin light and go more slowly. To make the most gain it would be useless for a beginner to keep changing from one breed to another. As a matter of fact, it is not so much the breed as it is the strains of fowls whether or not they would prove to be most profitable. Those who prefer to hatch a large number of chickens in the winter, to dispose of as four- or five-pound roasters in the early summer, would find the Wyandotte or Plymouth Rock an ideal fowl to keep, but as it would be hard to obtain good, hatchable eggs in the early part of the winter, he must first learn how to produce the necessary number and the kind of eggs that will produce the strong, vigorous chick required.

One branch of the poultry business which is nearly if not quite as profitable as egg farming is the growing of capons or soft roasters, to be marketed in the months from March to July. They would be six or

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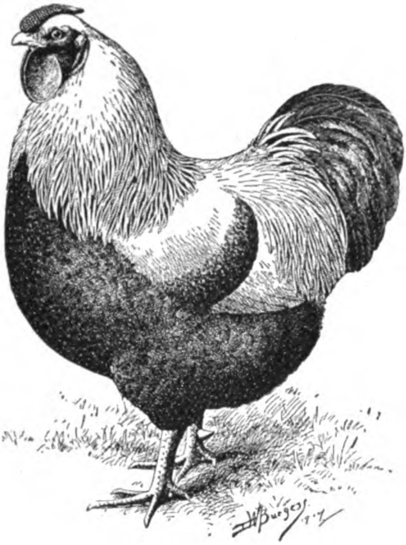
eight months old and weigh from eight to nine pounds each when dressed. The breeds best adapted for this purpose are the Light Brahma or Orpington, either White or Buff. This branch of poultry farming would require more capital for the reason that you would have to keep and feed them from six to eight months before your money comes back, while egg farming, if managed rightly, would bring in cash returns every week.



A Silver-penciled Wyandotte cock.

The question of choosing a breed for utility might appeal quite differently to another, but the principal point to consider is how to make the most on the money invested. A person would make a mistake if he settled down to one breed, if he had not first paid a few visits to some of the poultry farms located in his own section or county. However, the choosing of a breed of poultry for utility is a question that will bear a great deal of thought and constant figuring, and must be chosen to suit the person that owns them.

"Keep away from the country," says comedian Raymond Hitchcock; "there's nothing in it. This man, who is always trying to get himself elected president, thinks he knows a lot about the country, but he does n't. He says, 'I'll fix the price of eggs.' What influence has he got with the hen? I know a lot of hens, personally, and I have taken them aside and tried to reason with them; but it is no use. If a hen is laying one egg a month the price of eggs is going up, no matter who wants to be president; and if every hen is laying an egg every day you 've got to sell those eggs for what you can get for them. When eggs stand around they get unfriendly."

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SELECTING YOUR BREED.

By C. M. Reynolds, in *Poultry Culture.*

In selecting any breed of chickens there are three very important questions which everyone intending to embark into the business should ask themselves in regard to the breed they intend purchasing:

Are they good winter layers?

Do they mature quickly and make good market fowls?

Does their color and other points make them attractive as an exhibition bird?

Some select a breed for their egg production, others for market purposes, and a great many for beauty; but the wise poultryman is the one who, after careful study and experiments, selects as near as possible the breed that will make the best general-purpose fowl, one that is popular and always in demand. The farmer does not raise weeds, sunflowers or thistles expecting to find a market for them, and the same may be applied to the chicken business. You should select a breed that has proven beyond a doubt that they are splendid egg producers, mature quickly and make a good market fowl, and are unsurpassed as an exhibition bird.

A fowl that is not a good egg producer is worthless at any price.

A fowl that will not mature quickly for market purposes or begin laying early is losing you money every day.

One that does not make a handsome appearance in the show room will never be popular as an exhibition fowl, nor command the best prices.

There is no fowl more beautiful than the White Plymouth Rock when in the pink of condition. Their snow-white plumage, bright red combs and face, and their rich, yellow shanks make them a splendid exhibition fowl. As egg producers they are unsurpassed, while as a market or table fowl their large size, fine-flavored flesh, long, broad backs and deep breast bone put them in a class by themselves.

Twenty years ago it was conceded that anyone who went into the poultry business had more money than brains, but to-day some of the smartest and well-to-do people in the country are giving their whole time and attention to the business and are realizing handsome returns for their efforts.

To-day statistics show the value of poultry products to be more than the combined value of all the wheat and corn grown, and in money more than all the gold and silver mines produce in a year. There is no business that offers greater opportunities to the man or woman who will go at it with a determination to win and stick to it.

Select the breed of chickens you like best, stick to the one breed, exhibit your birds at the poultry shows, so the breeders will know what kind of stock you have, then advertise in a few of the best poultry papers, and success will be yours if you do your part.

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MISTAKES OF THE BEGINNER.

From *American Cultivator.*

It is well for the beginner to adopt the advice of men who are veterans in the service, in order that they may avoid many of the stumbling-blocks.

Too many novices start on too large a scale. They are not content to begin at the bottom round of the ladder and gradually climb to the top. That is too slow for them. If blessed with sufficient capital they are pretty sure to start on a large scale. Without experience, is it any wonder that they do not succeed?

But this is not the only cause of failure with the beginner. The others might briefly be stated as having too much land; buildings too scattered, entailing too much unnecessary labor; the breed or breeds selected not being suitable for the purpose intended; houses not built upon the sanitary plan; too much changing of the bill of fare; unmindful of small details; harboring too much unprofitable stock; carelessness in caring for ailing birds; relying too much on hired help; and learning too fast.

It is a waste of money to buy too much land. From five to ten acres is sufficient for the largest kind of plant.

A general mistake is the continual changing of the bill of fare. There should be one system in feeding and that regularly followed. The bill of fare should contain the greatest variety possible, but the system should not be changed. New articles of food should not be given to the exclusion of others until the fowls have had a chance to become acquainted with them. All additions or changes should be gradually made. If the fowls are doing well on what they are getting, no change should be made at all. Probably the most common error is "learning too fast." It is a noteworthy fact that, as a rule, by the close of the first year the beginner forms the opinion that he knows it all.

The hen is but a lowly creature, yet without her the history of Kansas had been different. Supporting the pioneer till the earth should yield; upholding the hands of the settler who wrought out a new agriculture; tiding over the dry weather and destroying its myriad insect life, the hen has maintained herself and helped to build a state to which she now brings wealth. Her yearly product exceeds in value our butter and cheese; equals one-half the worth of all our hogs, and totals with all the rye, barley, speltz, buckwheat, sweet potatoes, Irish potatoes, castor beans, cotton, tobacco, flax, broom corn, millet, honey, beeswax, wood, cheese, fruits, vegetables and sugar beets added together. Each year she creates more than eleven millions in new wealth out of the weed, the worm and the bug, and has but scant care on the farm and none from the fostering hand of our legislature.—*I. D. Graham, in Kansas Farmer.*

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SHALL I RAISE POULTRY?

By L. S. JOHNSON, *in The Feather.*

"Shall I raise poultry?" This is a question that is being asked and turned over and over in the minds of many thousands of people who are tied to desk, counter, shop or some other confining position. I say to them: Certainly raise poultry, and the quicker the better. That job of yours is awful and you need to do other work. But listen: Don't go in too heavy at the start, nor give up your income for a while, at any rate. Make a start, try your hand; see if you are adapted to the work, and then if it proves that you can make a success in a small way, you will feel safer in quitting your job and turning your back on the high bricks and stone walls; shake the dust of the street from your feet and go to the free, open country and live the life of a poultry farmer. You will then be healthy, happy and free. Almost anyone can find room for a few hens and a male, a bunch of day-old chicks, or a few setting hens, each with a clutch of eggs. From that day on, if you get out of bed an hour earlier and come direct home from work and spend an hour caring for your poultry, you will be healthier and the day's work will seem easier, and, if rightly cared for, it will not be long until you will eat real eggs for breakfast and they will not cost you five cents each, either. There are three ways of getting started. The first is buying matured stock, which is, in my opinion, the surest and safest way, for these reasons: You have the foundation and can set the eggs, and should the old hen leave her nest, break her eggs, or your incubator lamp go out, or any other accident happen, you would still have the parent stock. The second and cheapest way, provided you have good results, is buying eggs and a few old setting hens or a small incubator. The third and quickest way to get young stock is to buy day-old chicks. It matters not how you start, but start slow and grow as your knowledge of the business grows.

We all have to crawl before we walk, and if we can not make a success with a dozen hens, nor raise two dozen chicks to maturity, how can we hope to care for a hundred or more fowls? Poultry is becoming one of the greatest sidelines known, and is in many ways so different from others of its kind, as it gets your mind away from business and gives the much-needed outdoor exercise, as well as paying big when rightly handled.

Get a few hens, a clutch of eggs or a bunch of day-old chicks, and a few months' care will either cure the case of hen fever or intensify it. In either case, it will be well. If the first happens you will still have your job, and if the second you can keep right on, for the little hen is good to tie to.

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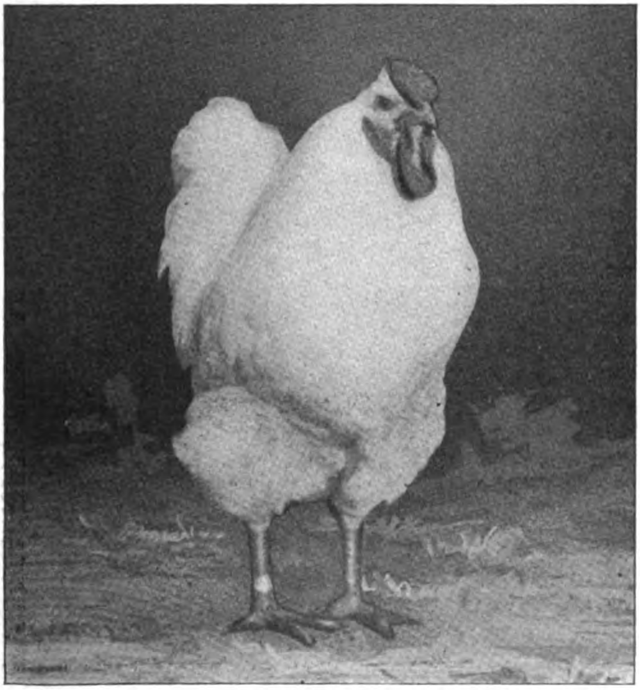
POULTRY KEEPING FOR THE SELF-SUPPORTING WOMAN.

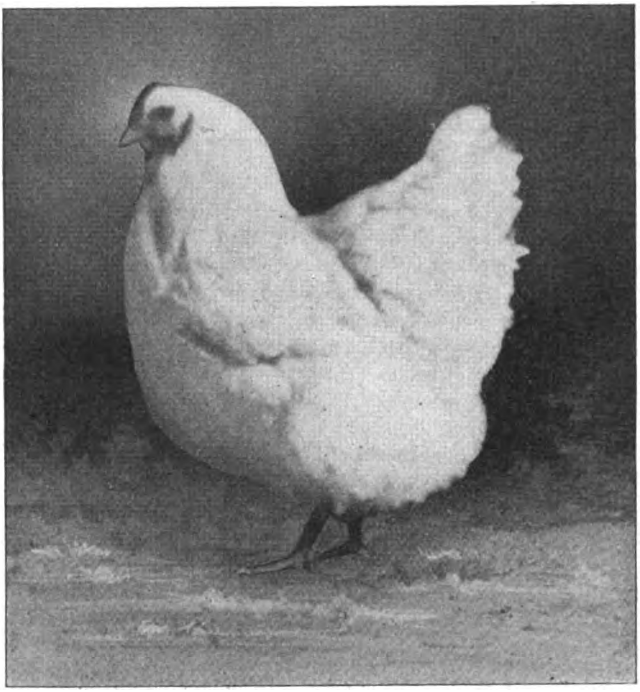
By Frances E. Wheeler, in *American Poultry World.*

There are several ways in which a woman can start in the poultry business, but the fundamental principle underlying them all—if she would succeed—must be a genuine liking for the work, a thorough enjoyment in rural life through almost all its phases. This is a work-a-day world; most of us have to "earn our bread," and life is a serious affair to nearly everyone. It is therefore of the utmost importance that our labors should be employed in a congenial atmosphere, where no or but little energy is lost through friction. We will need it all before the trip is ended! Another phase of congenial employment is the cheerfulness which is ours and the enjoyment we get out of the "daily round, the common task." These are wonderful levers toward success.

Given a liking for country life and a real interest, an interest which tends toward enthusiasm in poultry, a woman's next qualifications are, naturally, *persistence*, *thoroughness* and *common sense.*



A White Wyandotte cockerel.



A White Wyandotte pullet.

It is absolutely necessary to possess perseverance and a faith in one's self and work, that will carry one forward from season to season, over and beyond discouragement, to a higher and better grasp of the business and of one's self. Each failure is a round in experience's ladder by which we mount.

Just because poultry keeping is made up of little things, little duties, little chicks, a woman must either possess or acquire thoroughness and alertness, which will bar out effectually and absolutely slackness and negligence. In no other business that I know of do trifles show so quickly which way the wind is blowing or does Nemesis swoop down with so swift retribution on the forgetful and the unwary.

Now, regarding the last of the qualifications that we are considering, namely, common sense, I suppose this is a short way of saying, "to use our sense in regard to the common things of life." Taken thus, it is easy to see how important a position common sense holds in this undertaking of poultry keeping. In fact, how it must permeate every phase and control every thought of ours, if we ever attain the end toward which our labors are directed. Common sense must decide not only one's vocation for chickens, but the work that a woman can and the work that she can not do in the poultry field.

Doubtless it is true that in many ways nature has given woman cer-

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tain advantages over man, as, for example, in regard to the care of little, tender things—the "mother instinct," we call it, which tells her what to do for and how best to care for the helpless and dependent. So the rearing of little chicks, their food, houses, yards, and so on, comes naturally to many women, and they love the work.

There is much, however, on a poultry plant, especially a large one, that a woman is unfit for; therefore it is important for her to study her limitations and conform to them. Again, sacrifice is connected with every gain in life. We have a loss with every blessing. This is a law of nature. Therefore, it is well to count the cost at the start. To view soberly and with as unbiased a mind as possible both sides before the final plunge.

HOW A WOMAN SHOULD START.

I find that giving advice is a very difficult and embarrassing affair. While loyal to my special cult, I have come to realize that it is not every woman that "makes a go" and is happy in it. And I do not feel capable of either saying "keep out," or "come in." The business seems to be much of a lottery. It is, in this, like matrimony—once in it 's hard to get out, and shipwreck is easy.

1. From what I 've seen and meditated and experimented on, I judge that a woman who has a father, brother or other near male relative whom they can call on in an emergency, is quite in clover, and can go further, risk more and do better than she otherwise could.

2. If a woman is, or contemplates, running her plant alone, she would better begin with a few birds and after a small and very cheap fashion, keeping a strict account and using her wits the best she knows how to more than make both ends meet the first year, and increasing her output very slowly and carefully from season to season as the market and grain bills seem to justify.

3. It is a very poor method, and invites failure, to expend the larger part of one's income or capital in the outfitting of the plant. There should always be kept in reserve a fund sufficient to "make good" during the unprofitable season which is sure, at one time or another, to overtake us. During the first year, if the birds pay for their food and a fair interest on the funds invested in the plant, we may feel justified in a second year's trial. After that they should bring a reasonably good clear profit above labor expended, food and interest on investment.

A WOMAN'S LIMITATIONS.

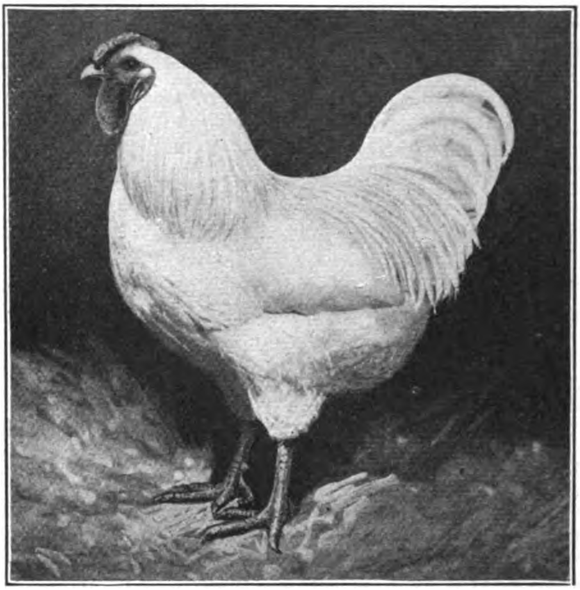
Regarding a woman's limitations along the lines of work that are now under our consideration, the following are among our most important.

1. She has not been educated along lines of "business honor," and so it takes her some time to learn the value, as a producer, of a reputation for reliability; that her goods must be exactly as represented and delivered when promised; that a bargain is a bargain; that in each and every case, *personal* loss or inconvenience *does not enter*. The customer and the bargain are alone to be considered.

2. Again, being women, we get best results by conducting our business in a womanly way. Agreeable manners, looks, words are woman's best, and, in fact, her only really satisfactory weapons. "Pat him on the

head and say, 'Good dog, Towser,'" has controlled many an ugly predicament. In a word, women should "out-Herod Herod" to successfully compete in the business world with him. Onto *her* best graft *his* best.

3. In connection with our limitations there is another point—that of a poultry woman's dress and general appearance. Men surely have a great advantage over us on this head, their style of clothing being much more suitable and easily adjustable. Besides which, they somehow look fitter for the labor of the poultry plant than do we. For instance, if a man's hat or cap is on crooked it don't seem so very bad, while if a woman's is on crooked she looks—the less said the better.



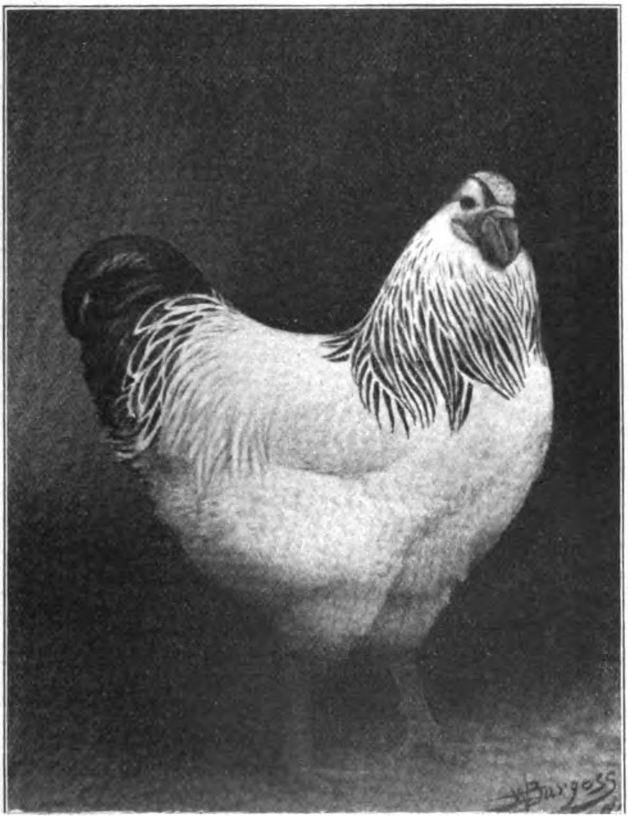
A White Wyandotte cockerel.

I think that what some of us need, first of all, is a good-sized mirror in kitchen or living room, for occasional object lessons. The fundamental point, of course, is a neat head and a dress plain and serviceable. The "extras" I find helpful are a pair of rubber boots, bloomers that can be slipped over the dress skirt on occasion, a plain hat for shade and a cap for wind, a *big* apron with a belt, gloves for "grubbing." If one's skirt clears the instep, one's shoes are trim, one's collar and tie correct, then if the hair does get rumpled it is not so very bad, and is really at times unavoidable. With the help of the mirror we can keep presentable.

SAVING LABOR.

Physically, as before explained, a woman is unfit for the heavy, dirty work of a sizable plant and the care of the birds during storms and inclement weather. The writer knows that in the long run this does not pay and is an expensive alternative. If "need's must," her flock should be small, her henhouse near and outfitted with every labor-saving device obtainable.

Our experiment stations and our brainiest men have been for many years thrashing out the best labor-saving devices of all kinds; so that to-day a complete hen or brooder house can be built at a fair price, "with all modern conveniences," and which will almost run itself. Among the useful tools that can be home made, and cheaply, are the dry-feed hopper, new trap nest, drinking fountains, feed troughs, and so on. Plans for these can all be secured from the experiment stations, free of cost. A good sprayer can be purchased for about $12, and this is almost the only "bought tool" needed, as nearly every home has its wheelbarrow, hoe, broom, shovels, etc.



A Columbian Wyandotte cockerel.

Before leaving this subject, pardon one word more concerning our state experiment stations. The one at Storrs, Conn., that I visited last summer when the State Poultry Association met there was an object lesson to me of a value not to be overestimated. We simply do not com-

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prehend, until we see one in running order, what the experiment stands for and means to us. It is our fountainhead for every kind of instruction, information and help, and because it is a state institution, paid for by taxation and conducted by the very best sort of men and under the most favorable conditions that our government can give us, is why we can ask and receive this information and instruction. In a sense it is on the footing of our public schools and is accessible in the same way.

PERSEVERANCE AND PLUCK COUNT FOR SUCCESS.

It is because of this loneliness in our lives that courage, enthusiasm and self-confidence count for so much. And as we realize the number of our coworkers and their achievements in the various branches of poultry culture, we grow to realize, also, how much may be accomplished by a woman who believes utterly in herself and in the employment of her choice and is not discouraged even when quite serious obstacles have to be surmounted and difficulties and disasters come thick and fast. We are apt to think that our own special line of work (poultry raising) is especially open to loss and trouble of all sorts. But this is not so. Run any business alone and it is the same—lots of worry and discouragement; some success and some failure.

A salaried position is on an entirely different footing, and the pay is sure and only dependent on our fulfilling certain conditions so long as the position holds good. The satisfaction that comes from labor is in creating, building up something of one's very own, putting the stamp of individuality on the work of one's hands; owning things, watching them develop from almost nothing and grow in symmetry and beauty under one's own thought and ministrations; producing what we know is above the average and has a market value of its own, or a rare excellence; realizing a fair profit in cash, as well as a fair profit of the finer sort which a close companionship with nature brings, and the joy of country living.

PROFITS THAT SHE CAN EARN.

Among superficial investigators there is a prevalent notion either that "there is no money in chickens" or that poultry has a sort of "wildcat profits"—profits that come without volition on our part and simply overwhelm us. It is needless to say of these opinions that one is as unfair as the other. The time is nearing fast when poultry keeping as a business will be rightly understood by the public and will hold its correct position as an employment that requires sane and sensible manipulation, and in agriculture is second only in importance to the bread-producing stuffs.

That in return for a fair understanding of the business and a fair amount of the work, there is good and reasonable profit. That this profit comes in exactly the same way that profits accrue from other commercial enterprises, and necessitates the very same sort of handling and ability. That the growth of a plant that is "worth while" is gradual, and its life should be a long one. That we women have no room in poultrydom for mushroom aristocracy.

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POULTRY MANAGEMENT.

By BARNET RABKIN, in *American Poultry Journal.*

Like any other branch of man's activity, successful and efficient management of poultry is based on three main principles: First, planning ahead of the work and timely execution of the same; second, efficiency of labor (by this is meant the getting of maximum results from certain amount of work in a given time); and third, careful attention to all details of the undertaking, however small they are, as those little things, sometimes hardly noticeable to a strange eye, are often responsible for the success or failure of the poultry business.

With these three principles in mind, it will be readily seen that the management of a poultry plant must begin before the plant is really started, and the following items should be thoroughly considered:

(*a*) The volume of business, whether on small or large scale.

(*b*) Location of the poultry plant in regard to soil, water supply, market and other facilities.

(*c*) Type of buildings and their arrangement.

(*d*) The main source of income, whether from market eggs, broilers, market fowl, fancy breeding stock, etc.

(*e*) Selection of breed and breeding stock.

(*f*) When and how to start in the poultry business.

In regard to the volume of business, it is generally conceded that the safest way of starting with poultry is to begin small and grow up with the business, and this is the only safe way for a man who is unacquainted with poultry and poultry work. On the other hand, the man who has years of experience behind him and sufficient capital at his command may start on a reasonably large scale with greater profit. Efficiency of labor can best be exercised on a plant of considerable size, and the expenses of running a large plant are relatively much smaller than those of a small one.

As a rule, the most rational way of investing money in a poultry plant is to have one-third of it in land and buildings, one-third in live stock and implements, and one-third on hand for running expenses, as buying food for the stock and general expenses of the plant.

The selection of a suitable location for a poultry plant is a matter of vast importance, as on it largely depends the success of the undertaking. An elevated piece of land, sloping gently toward the south or southeast, with some protection from cold northern winds in the form of woods, offers a desirable place for poultry, as it affords excellent soil and air drainage. Sandy soil, sandy loam or gravelly loam are most desirable. Clay or rocky soil are objectionable, as they keep moisture for a long time and are cold.

It is most desirable to have running water on the poultry farm. It offers a constant supply of cool, fresh water for the fowls during the greater part of the year where it is possible to have a brook running

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through the lower part of the yards. When this can not be done, the question of water supply should be well considered before the location is decided upon, as should also that of market and transportation facilities. It is desirable on many accounts to locate near a large city, where private fancy trade can be developed, but because the land near cities is usually held at high prices, it is not often practical to do so. Nearness to trolley lines and railroad stations must also be considered. From a still broader point of view, we must look also for a good, intelligent neighborhood for educational facilities, post and telephone service, etc., in locating a poultry farm. All of these things go toward making the poultryman's life happy and contented, and consequently his work more successful.

In laying out the poultry buildings great care must be exercised in having easy and convenient access to them, so that the attendant will not have to make unnecessary steps in doing his work. Before starting the various buildings it is advisable to make a general plan of the farm and decide where the different buildings should be placed to the best advantage. Working plans for each building should then be made before the actual construction begins. This will save time and money, as it is easier to correct mistakes and make changes on paper than after the buildings are far under way.

Aside from the usual farm buildings, such as the dwelling house, barn, stable, wood and wagon sheds, a more or less complete poultry plant has the following buildings: Laying house for laying and breeding stock, incubator cellar, brooder house, colony houses for growing stock, feed and store room, and a fattening, killing and dressing room.

The type of laying house to select depends largely on the size of land devoted to poultry and the main purposes for which the business is being conducted. If the farm is of considerable size, individual colony houses, with large yards or unlimited range, is much to be preferred. The smaller the flock in each colony the better it is. Years of experience show that hens do their best as regards egg production and healthy offspring when housed in small flocks and given plenty of range.

The following is an extract of a report of an interesting experiment conducted at the Maine Agricultural Experiment Station: "The lots containing twenty hens gave a greater total net profit per lot than did those containing any greater or less number of hens. Lots with twenty-five hens gave slightly greater net returns than did the fifteen-hen lots. The lots which had thirty hens each gave very much less net returns than did any of the others."

The same tests indicated that generally the best results will be obtained by allowing each hen from eight to ten square feet floor space.

When the area of the poultry plant is limited a type of a long, continuous laying house is to be selected. A great advantage of such a house is the "efficiency of labor." To increase the value of such a house, double yards must be provided; thus, when one yard is occupied by the birds the other one is spaded or ploughed up and seeded to a quick-growing crop, as oats, buckwheat, etc. Double yarding not alone enables the poultryman to keep the yards in sanitary condition, but also to keep his birds supplied with green stuffs the greater part of the year.

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HOUSING.

Practical experience in poultry housing for the last decade has proved that open-front or fresh-air poultry houses are far superior to those of the old, closed-front type. To prevent snow from drifting in such a house in winter the front is boarded up to a height of from one and one-half to two feet from the floor. The floor of such a house could be of earth, of concrete, or of boards. When the floor is an earthen one, the earth inside the house must be two to three inches higher than the earth outside, to avoid dampness. Once or twice a year from five to six inches of the earth should be removed and fresh earth put in its place. The advantage of an earthen floor is its cheapness and that it provides a fine place for the fowls to wallow in. The disadvantages of an earthen floor is that the house is not rat proof and it is hard to keep clean. A concrete floor is the best, especially for permanent houses. It is rat proof and can easily be kept clean. It should always be provided with a layer of sand from two to three inches deep. A board floor is good for portable colony houses. If such a floor is underlined with half-inch-wire netting it will prove rat-proof. Board floors should also be covered with a layer of sand, and this should be changed at least twice a year.

FIXTURES.

The interior fixtures of a laying house are very few, and are to be made as simple and convenient for cleaning as possible. The roosts should be made of 2 x 3-inch scantling, planed and rounded at the top edges. They should be placed twenty inches away from the black wall and about fifteen inches apart from each other. The roosts should be made removable. The nests should be made roomy and comfortable for the hen, and easy to clean. The dimensions for a good-sized nest are 12 x 12 x 12 inches. They should be placed in a secluded part of the laying house, with the opening where the hen enters away from the light. The nests should be kept well supplied with clean straw, shavings or other material to avoid broken eggs in the nests.

INCUBATOR CELLAR AND BROODER HOUSE.

The most important requirement of an up-to-date incubator cellar is the maintenance of an even temperature throughout the year, and perfect ventilation without drafts. The right temperature should be about 60 degrees Fahrenheit. The cellar should be built about four feet below the surface and from three to four feet above it. The windows should face east or west and the door at the south. A dark room for testing eggs is a valuable addition to an incubator cellar.

Of the two kinds of brooder houses, one for individual brooders heated by lamps, the other hot-water piped, each have their advantages. The individual brooder house offers a better and more correct control of the temperature; a hot-water brooder house is a great time and labor saver and is better adapted to an extensive poultry plant. In both houses, however, the plan of the buildings is practically the same. Approximate dimensions are: 12 to 14 feet wide, 6 feet high at the eaves, even span, the length according to the number of chicks to be brooded. It is advisable to figure not more than fifty chicks for each brooder. A brooder

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3 x 4 feet will comfortably accommodate this number up to about six weeks old. The main requirement of a good brooder house is evenness of temperature, good ventilation and plenty of sunshine. The windows should all face south and southeast.

A good type of an individual brooder house is that introduced by Professor Stoneburn, of Storrs, Conn. The main feature of this house is the passage way at the back being two and one-half feet lower than the floor of the chick run. This makes the work around the brooders much easier, and the north wall being only three and one-half feet high from the outside makes the house much warmer.

OTHER BUILDINGS.

The feed room should be located near the laying houses. The simplest way of making such a building rat proof is to underline the floor with one-fourth-inch galvanized wire netting and tack it to the wall twelve to eighteen inches above the floor. Bins should be provided for mixed foods, grains, etc. Under the same roof with the feed room might be built the killing and dressing room, and this should be constructed with an eye to perfect cleanliness. Such a room should be provided with a stove for use in cold weather, and the room should have sufficient windows to have it well lighted even on a cloudy day.

Aside from the buildings mentioned above, a house for sitters should also be provided, one having an oblong yard that will admit of a hen's flying or running up and down for exercise while off the nest. There should also be several colony coops for special matings, or for birds slightly indisposed that could be moved to an isolated house and properly cared for. A few of these movable colony coops should be on every plant, as they will prove a great help to the poultryman in an emergency.

SELECTION OF BIRDS.

There are so many breeds of poultry that it should not be difficult to select one to suit any purpose. Leghorns and Minorcas are preferred by many for egg farming. They lay white-shelled eggs and many of them. It should also be remembered that they need a good range and do not thrive well in confinement. With market poultry in view, many prefer the Asiatic breeds—Cochins, Langshans and Brahmas. The latter are especially desirable for soft roasters and capons. When an all-around fowl is sought, nothing will equal the American breeds—the Plymouth Rocks, Wyandottes and Rhode Island Reds. They lay well, they make fine broilers, are good, reliable mothers, and after their usefulness in life is past they furnish a fine, plump carcass that when well dressed will bring a good price in any market. They do their best on range, but stand confinement well.

Whatever breed is selected, the main thing is to have only such birds as are strong in health and constitutional vigor. The initial stock is the cornerstone on which the success of the undertaking is based; therefore the best care and judgment must be exercised in selecting the birds. Particular attention should be given the breeding males, as in regard to the offspring they represent half the flock. Any bird selected for breeding purposes should be free from any organic defect, as crooked back or breast bone, wry tail, etc. They should be of good size and as near

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standard weight as possible. They should be alert and carry the body easy and erect. Other signs of good health are a round, medium-sized head; a stout, nicely curved beak; bright, full eyes; bright red comb and wattles; medium-length, stout and well-curved neck; broad back; deep, long breast; nicely folded wings; rather short, stout, straight legs, well spread apart; rather broad behind the pelvic bones, well spread and pliable (in females); well-spread, upright tail; plumage close and lustrous. In disposition, healthy birds are active, spend most of their time in scratching, and are not easily frightened.

WHEN AND HOW TO START IN THE POULTRY BUSINESS.

This, of course, depends largely on circumstances. Under ordinary conditions, however, the best time to start in the business is early in summer, in May or June. Have the houses put up, the yards fenced in and seeded down, so everything will be ready in September. By that time the houses should all be dried out, the yards green, and everything ready for the birds. The breeders should then be selected from a reliable source, and it is economy in the end to visit the plant from which the stock is to be bought and select the birds.

Two-thirds of the stock should consist of pullets, April and May hatch, the rest of yearling hens. The pullets will be the winter layers, commencing some time in October or November. The hens will begin laying in January or February, or earlier. Their eggs should be used for incubation. It will be necessary to buy some eggs for hatching unless a large number of breeders have been kept, and in such case, unless the incubating facilities are sufficiently large, it will be wise to buy day-old chicks. When the season is over the hens can be put in condition and sold as market poultry, and the best pullets of the last year, now yearlings, will take their place as breeders for the next season.

One very important point in poultry management is to have the birds laying well in winter when eggs command the highest prices. Ordinarily pullets commence laying when six to seven months old, consequently we must plan to have enough pullets hatched in March, April and the first part of May.

When the chicks are three months old, cull out the undesirable ones and market as broilers, and give your time and food to the good ones. They should, if possible, have free range. They must be fed three times daily; cracked grains morning and evening, and a rather narrow ration of soft mash at noon. Grit, oyster shell, charcoal and water should be before them at all times. It is also desirable to keep a dry mash before them either all the time or at least the greater part of the time. The growing stock must go to bed with full crops or their growth will be retarded. Allow them also a liberal supply of green food, some form of animal food, shade during the hot weather, and shelter from rain. Their houses must be kept reasonably clean and as free from vermin as possible. Give them plenty of fresh air by having them housed in open-front houses.

Preparations for the winter quarters for the coming stock should be made not later than August. Houses and fixtures should be whitewashed, new litter placed in the houses, and the vacant yards planted with oats

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or buckwheat, and by the middle of September the pullets should all be in their winter quarters.

INCUBATION AND BROODING.

It has been repeated many times that the secret of success in raising chicks lies chiefly with the breeding stock. No matter what good work we do in incubating and brooding, so long as the embryo in the egg is not endowed with vitality, good results will not be forthcoming. We can expect strong, healthy chicks only from strong, healthy parent stock.

Eggs for incubation must be cared for with regard for what is expected of them. They should be kept in a cool, well-aired place, where the temperature can be counted on to vary but little. Eggs intended for hatching should not be more than two to three weeks old.

In the selection of incubators and brooders, only the best and most reliable should be considered. Then the directions should be carefully studied and followed. The incubator must be set perfectly level, and it should be operated several days before the eggs are set, to be sure that the desired temperature may be kept constant. Before putting in the eggs, cool off the incubator to the temperature of the room where it is to be operated, in order not to subject the eggs to a sudden change. The eggs should be tested at least once during the hatch, and the infertiles and weak germs discarded. As soon as the eggs begin to pip, the brooders should be gotten in readiness and kept running for several days before the chicks are housed in them. They should be in a clean, sanitary condition. The floor of the brooder should be covered with sand and a layer of hay chaff, cut clover or cut alfalfa over the sand.

The chicks must remain in the incubator not less than twenty-four hours to dry off, and they need not be fed until thirty-six hours old. They may be given a little luke-warm water and grit to pick at. After that they should be fed four or five times daily with fine-cracked grains. Hard boiled eggs crumbled fine and mixed with oatmeal is also good. Later they may have a mash made crumbly with milk. Bran, grit, oyster shell, charcoal and water should be constantly before them. A good green food must also be provided. For this purpose lettuce is excellent. The first few days the chicks must be kept close to the hover, and then they may be gradually taught to go in and out of the brooder. They should never be allowed to huddle outside the hover and under it; they should rather spread about in little groups than huddle close together. A good part of the poultryman's trouble in brooding is over when the chicks have learned their way in and out from the hover.

BROILERS AND ROASTERS.

People pay highest prices for products which are naturally out of season. Broilers command highest prices in winter and early spring. With plenty of winter eggs and the necessary incubating and brooding equipment, the raising of winter broilers is comparatively easy. The hatching should begin in the fall, so as to have good-sized broilers for the holiday trade. The broiler business is hard, tedious work, and requires, like most branches of the poultry business, plenty of experience, but it can be made profitable. The chicks should be well fed but not forced for growth until they are about six weeks old, when they should

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have made a good start, and may be fed mashes, soft or dry, with a goodly per cent of sweet beef scraps or milk. When one and one-half to two pounds the pair they may be sold as squab broilers, while from two to three and one-half pounds the pair they are known as regular broilers, and from four to five pounds the pair as large broilers or friers. Surplus cockerels are usually kept over until they weigh from three to five pounds apiece, and then sold as roasters. But frequently it is advisable to caponize surplus cockerels. When rightly conducted this branch of the business is very profitable. Ordinarily a capon will weigh at least three pounds more than a roaster of the same age and under the same conditions. The meat is always tender and much more palatable and commands a much better price than the ordinary roaster. The cockerels should be caponized when from two to three months old. Only strong, healthy cockerels should be used for capons. They should be kept closed in without food for two days before the operation is performed, and given soft food and free range for a week or so after the operation. Sometimes after the operation a wind puff forms, caused by the skin healing before the inner wound. In such case, with a small sharp blade make an incision and let the air out. Capons fatten readily and may be kept in prime condition for some time. They make a most excellent plumpy, juicy table fowl.

As a rule, the markets are well supplied with poultry products of ordinary quality, but the supply of good poultry is much behind the demand for same; hence high prices for first-class poultry. The object should be, then, the production of high-grade stuff, especially in building up a fancy private trade. Along this line much may be accomplished by proper fattening, but this does not mean the addition of a layer of fat over the carcass. The main object of fattening is to finish the bird, to make it more meaty, and the meat tender, juicy and more palatable.

There are two practical ways of fattening—pen and crate fattening. In pen fattening, the birds are simply restricted to a pen with a small yard attached, and are fed fattening rations. In crate fattening the birds are kept in smaller numbers, four to six, in specially made crates in a darkened place. Pen fattening is in many cases more convenient, but crate fattening can be easier controlled. The fattening period is three weeks. The day the birds are put in they are not fed at all, only water given them. The next few days they are fed sparingly, and then they are given all the food they will eat three times a day. In fattening, the appetites of the birds must be kept keen, and if the food is supplied them they will take on fat rapidly. Corn meal, wheat middlings, buckwheat flour and oat flour are the principal stuffs for fattening. The food is usually fed wet, about the consistency of thick cream. Skim milk, sweet or sour, and buttermilk are valuable and inexpensive ingredients in food for fattening poultry.

ADVERTISING AND MARKETING.

To make a success with poultry, as well as in any other business, it is not enough to produce the goods. One must be able to sell his product to the best advantage. One reason so many farmers fail is because they are poor business men. Business ability is a gift in itself, and not many rules can be laid down to this end. One must study the different ways and means of the poultry business, know the market demands, and keep his eyes open to what is constantly going on in the poultry world.

In marketing a product, the appearance must never be sacrificed because of lack of time or expense of having it look right. It is the good looks of a thing that attracts people's attention. The egg boxes and shipping crates should be neat and attractive. As the markets nowadays are as large and wide as the world, it is advisable, and often necessary, to advertise the product. Such advertisements should begin in a moderate way and enlarge with the growth of the business. An ad must be timely and convincing to be of any value. It is a good idea to have a trade-mark, a motto or something like that which can be easily remembered by the general public. Once adopted it should never be changed, and should always accompany your ad.

A most important part in marketing a product is to satisfy the customer by giving him a square deal, so that he will come again and again. Be prompt in your correspondence. Much of your business depends upon it.

There are a few things that seemingly bear no relation to poultry, yet they are of great importance in the successful management of a poultry plant. One of these is that of planting fruit trees and shrubs in the poultry yards. Trees provide the necessary shade for the fowls and chicks, keep the soil in better condition, make the surrounding air cooler and fresher, and provide the birds with bugs and worms. Aside from these advantages, the trees make fine growth, are practically free from insect pests, and supply the poultryman with fruit. Plum, peach and quince trees are especially adapted for use in the poultry yard.

ESSENTIALS IN POULTRY CULTURE.

By F. C. BUTLER, in *Successful Farming.*

The first essential is pure, fresh air and lots of it, but cheap as it is, a sufficient supply of it is the one essential most generally neglected. Don't be afraid of the pure, cold air; it is the steaming-warm, impure air that causes ill health, and any deviation from perfect health on the part of your fowls means very few eggs.

Now comes feeding. No method is right that does not take into full consideration the food material at hand with which to work, or the labor necessary to utilize and feed such material. In feeding for winter eggs it is assumed that all the fowls have been well fed up until this time, and that the pullets have been kept coming along to early maturity by an abundance of clean, nourishing foods. Do not think for one moment that you can make up for five careless summer months by two to four weeks careful, thoughtful feeding in November.

That meat in some form has come to form a part of the modern winter egg ration seems assured. Small back-yard flocks can sometimes secure enough from generous table scraps, but in large flocks it must be supplied in sufficient quantity. Beef scraps can be purchased, and as pre-

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pared can be easily fed. Beef scrap is, or should be, that part left after the tallow and grease have been taken out, or the trimmings and bones left after the beef creature has been cut up. All this should be put into boilers, treated with live steam and fats and greases taken off, and the residue squeezed dry and then ground to required degree of fineness.

All the so-called beef scrap is not what it pretends to be. Some is nothing but little better than "tankage." Use care in buying, and see to it that you get not the cheapest but the best, which is always cheapest. If you are in doubt as to whether the beef scrap offered by the dealer really contains sufficient protein, you can send a sample to your state college for analysis and soon find out.

Every poultryman has his or her notion or theory as to the relative value of wet mashes or dry feeds. Personally, I prefer dry feeds and hopper feeding. Whatever you use, one should take into consideration the relative costs of foods close at hand and available at small cost. It is not always most practical to buy the foods known to produce, when the foods at home can be utilized and so be made to yield a profit. The bulk of our feed will be wheat, corn, bran and beef scrap. It is not practical to buy high-priced wheat when one has corn of their own, although a little should be fed if possible. If we use a goodly supply of green stuffs, such as vegetables, cut clover and alfalfa, a sufficient variety is secured. Whenever you can, feed milk in any wholesome form. The fowls will enjoy it given as a drink, or one can use it to moisten the mashes if fed.

Another essential is water. Make it your regular business to see the fowls have all the water they can drink, at a moderate temperature. The drinking founts should be kept clean, and at frequent intervals thoroughly scalded, not simply rinsed. The amount of water your fowls will consume is astonishing, so make it your business to see that they have fresh, clean water all winter. When so cold that it will freeze use metal dishes or founts, and water can be warmed when placed before them. This will allow confined fowls ample time to drink before it freezes if open-air houses are used.

Hopper feeding is practical on the farm, but the habit of throwing the corn or grain to the hens will long endure. At least arrange hoppers containing shell, grit and charcoal, and others for beef scrap and dry bran or dry mash. Hopper feeding these will cut down the amount and also balance the grain ration.

Another essential is comfortable sleeping conditions. In winter a loft of clean straw brought down close to the heads of the fowls and a curtain dropped down in front will provide comfortable yet well-ventilated sleeping quarters in even an open-air house. A hen that sits perched in a cold henhouse all night will not produce many eggs, but a hen properly fed, comfortably roosted and busy during the day will produce.

A small flock of pullets, for want of room, were allowed to roost and lay during a whole winter in a lampless brooder. At night these pullets snuggled in under the brooder hover, and they all layed steadily. They did not have to fight the cold at night, but got the full value of their own animal heat all night. Perched on a high roost in a cold house, a hen loses this valuable natural animal heat, surrounded as she is by the cold

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on all sides. It takes a little time to make your winter layers comfortable at night, but it pays.

In my poultry medicine chest there are very few drugs, and I use these mostly for the brethern who have recently begun keeping poultry. I use common coal oil for colds, and usually stop them before they have degenerated into roup. I have had just two cases of roup in my yards in five years, and I cured both of them. I keep a sewing machine can full of coal oil, and as soon as I see one of my chickens running at the nose or sneezing I squirt a little coal oil into its nostrils and in the slit in the roof of its mouth, with some straight down its throat, and nineteen times in twenty that bird is well the next morning.

I keep permanganate of potash solution on hand all the time. I take half an ounce of the crystals and dissolve them in a quart of water in a common glass fruit jar. This makes a very dark, purplish solution. During the winter about once a week I put enough of this solution in the drinking water to make it pink. If my neighbors are having trouble with roup or canker I use the solution every day. Permanganate of potash is a powerful germ killer, and when the hens drink it germs do not bother them very much. For roup I dip the head of the patient in the solution in the fruit jar until it strangles a little, and then swab the mouth out with a mixture of equal parts of peroxide of hydrogen and water. Once a week I give my hens a little dose of epsom salts in their mash. If a hen seems mopy I give her a third of a teaspoon in water, but for the regular weekly dose I use about a teaspoon for six or eight hens. This is enough for twenty young chicks or a dozen half-grown ones. Dissolve the salts in a little water and use the water in mixing the mash, working it over thoroughly. When given in this way every bird gets its share. Epsom salts (magnesium sulphate) removes the slimy secretions from the intestines, cools the blood, promotes digestion and is about the best thing a poultryman can keep in his medicine chest.

By carefully watching the flock and taking prompt care of every fowl that seems at all out of condition I manage to get along with a loss of less than two hens in a hundred each year from disease.

Insect pests are like the poor—always with us. They come from the birds of the air, are carried from one flock to another by visitors, and, I sometimes think, are blown on the winds. Cleanliness is a first aid in keeping them in subjection. The red mites, which are the most common insect pest, is a night prowler, and leaves the fowls in the daytime to hide under perches or in any cracks it may find. Painting the perches on all sides and the walls of the poultry house inside with coal oil which has an ounce of carbolic acid to the gallon mixed in will effectually prevent these little red pests from gaining a foothold. The painting should be done once in two weeks at least in summer and once a month in winter. The real lice which live on the bodies of fowls are less common and do less damage than the mites.

I have said more than once and am not ready to retract, that insect enemies cause more loss to poultrymen than all the diseases combined, and I consider it very important to keep them in subjection. I have not seen a poultry mite in my poultry houses for years, but I keep right on

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pretending they are there and using means to keep them under my thumb.

Body lice may be driven off by using any good insect powder, sifting it through the feathers while the bird is held up by the legs.

Herein I have set down the most important "secrets" of success with poultry. Dispose of the hens before they become unprofitable pensioners; keep the poultry house in the best sanitary condition, seeking the comfort of the fowls, thus avoiding disease; fight the insects tooth and toenail, year in and year out, and the hens will do their best to produce eggs to the limit of their individual capacity.

MAKING POULTRY PAY.

From *Illinois Farmers' Institute Bulletin.*

While it may be safely asserted that in proportion to capital invested larger profits are derived from poultry than from any other live stock, yet farmers as a rule do not give that consideration to the poultry department to which it is justly entitled.

Success or failure with poultry depends entirely upon the management, and in studying the cause of failures the poultry keeper must hold in view the fact that the fowls are creatures in his charge, and that upon his judgment hinges the question of profit or loss. A careful study of the causes of failure of many who have ventured into the poultry business leads us to conclude that the following are the chief reasons:

1. Endeavoring to keep too many fowls where room for one only can be obtained; that is, saving in expenses by cheapening cost of houses and space.
2. Buying fowls from other farms, and thus bringing disease and lice into the flocks.
3. Overfeeding, the fowls being supplied with greatest abundance under the supposition, "the more feed the more eggs."
4. Cold drafts over the fowls at night, with a view to supplying fresh air, when the temperature is low.
5. Wasting time with sick fowls instead of destroying all birds that can not be cured quickly.
6. Disregarding the breeds by keeping anything that is a fowl.
7. Lack of exercise, the fowls being idle, discontented and consuming food because they have nothing else to do.
8. Failure to provide sufficient warmth in winter, a season when eggs are highest.
9. Feeding corn and wheat exclusively and omitting foods which supply albumen for egg production.
10. Feeding three times a day, the result being indigestion and the introduction of disease in the flock.
11. Lice—both mites and the large lice that are found only on the bodies of the fowls at all seasons of the year.
12. Failure to keep the houses and yards clean. Labor is withheld at the most important period.

Success, therefore, depends upon the observance of certain rules, a negligence of the one being almost equivalent to disregard of all. Space permits the mention of but one—lice.

All poultrymen are willing to get rid of lice, but they seldom know when their fowls are infested. They examine the poultry houses and destroy the mites, but the real pests are seldom discovered. They exist at all seasons on the bodies of the fowls, usually close to the skin, on the heads, under the wings, etc. As soon as chicks are hatched these large lice go to them from the hens. A single large gray louse can torture a chick to death.

There are but two remedies for lice—examine frequently, work. To a quart of kerosene add one-fourth pint of crude carbolic acid. Shave a pound of hard soap in a half gallon of water, boiling until soap is in solution. While hot, add kerosene and acid, mix briskly for fifteen minutes, until a creamy substance results, then add twenty quarts of warm water, and spray every place where fowls are kept. For lice on bodies, add ten drops each of oil of sassafras, cedar and pennyroyal to one-fourth pint of melted lard, and apply daily until fowls are free from lice, but never apply oils too freely on fowls.

A little intelligent care given to the poultry industry on every farm will bring a profitable income to the farmer, while the consumer will be greatly benefited through a reduction in the cost of living.

POULTRY OF THE FARM.

From Ohio Experiment Station Circular No. 118, by W. A. Lloyd and W. L. Elser.

This investigation was begun in August, 1909, by the department of coöperation of the experiment station, with one coöperator. By the following February this number had increased to eighty-six, who were located in thirty-six counties of the state and represented widely varying phases of the poultry industry. The city-lot poultryman who kept his fowls penned throughout the year and who bought all his feed, the suburban resident with limited range, the farmer with unlimited range, and the commercial poultryman, were all represented. No strictly fancy poultrymen were included, though in a few cases a small number of fowls were sold for breeders and a few settings of eggs for hatching at more than market price.

OBJECT OF THE INVESTIGATION.

Commercial concerns engaged in the manufacture of poultry appliances have written into their catalogues glowing accounts of the poultry business, and abstract statisticians have figured extraordinary profits. Certain "systems" have given wide publicity to the enormous returns that have been secured on a city lot. Other "systems" eliminate the necessity of the lot without decreasing the profit. The city man, influenced by abstract figuring of grossly exaggerated returns, looks upon the poultry business as a sure road to wealth and feels that the price he pays for poultry and eggs is little short of robbery, while the farmer frequently, if not usually, considers the flock as unprofitable. To use his own language, "they eat their heads off." Somewhere between the point of view assumed by the producer and felt by the consumer lies the truth. To ascertain this has been the object of this investigation.

No advice has been given to coöperators at any time as to methods of management relative to the housing, feeding or care of the flock, the object of the investigation being to study conditions as they exist, not to teach what they ought to be. Indeed, it is doubtful if very much in the way of advice is necessary to a person giving careful attention to the purely business end of an enterprise. He can hardly study *how* the enterprise is yielding for any very great length of time without discovering *why* it is yielding satisfactorily or otherwise.

FEED AND LABOR.

Only two requirements of the investigation presented any serious difficulties. Under farm conditions the feed for the poultry is usually taken from the bin or crib as needed, often with little heed as to the exact amount fed per day. Moreover, this is a chore that is frequently done by children or by the women of the household. To get accurate data as to the daily ration would have entailed extra work and often seriously changed the method of handling the flock, which would have destroyed the value of the test. To avoid this difficulty it was suggested that the feed for the poultry be periodically set aside in large quantities and charged against the flock in lump sums. Supplies of shells, grit, etc., were handled in the same way. The approximate ration fed was also given. It was, therefore, easy to check these figures pretty accurately. This method so simplified the feeding operations that very accurate and trustworthy data were secured in most cases. The labor record presented more difficulties. Several members of the family are frequently concerned with the care of the flock. A few minutes many times a day is given to the poultry. To get a near approximation of the amount of labor, each coöperator was asked to keep an exact account of the time consumed by the regular work incident to the poultry management for a period of two weeks, and to take the average of this as the amount of regular daily work. This average was based on the time it would take a man to do the work. If two little girls occupied two hours gathering eggs that could have been gathered by a man in fifteen minutes, the latter amount was entered. Any extra work, such as repairing coops, marketing eggs, etc., was charged extra. The rate of man labor was based on the price paid for common labor in the community of the coöperator. Each of the flocks included in the circular has been visited by the author, and it is believed the results are accurate and trustworthy.

THE FLOCKS DESCRIBED.

We believe the flocks visited represent a condition rather above than below the average of the community in which they were found. They are by no means the best, and may probably be correctly said to present a fair average of those flocks which have received more than a passing interest. With regard to breed, the flocks classify as follows: American class, 16; represented by the following breeds: Rhode Island Reds 5, Barred Rocks 9, White Wyandottes 1, White Rocks 1. Mediterranean class, 9; made up of Brown Leghorns 5, White Leghorns 1, Buff Leghorns 2, and Black Minorcas 1. Asiatic class, 1; White Lang-

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shans; and mixed flocks, 4. In only three cases was any particular attention paid to standard requirements. The flocks were pure-bred rather than standard-bred. Nor could the four flocks classified as mixed be properly considered as mongrels.

While this investigation is not particularly concerned with a study of breeds or varieties, so much confusion among farmers exists with regard to the accepted terminology that it is well, perhaps, to get the distinction clearly in the mind.

1. *Standard-bred poultry* consists of flocks bred to meet the breed and variety requirements of the American Poultry Association.
2. *Pure-bred poultry* consists of flocks of distinct varieties without admixture of other blood, but in which no attention is given to the requirements of the standard.
3. *Cross-bred poultry* consists of the progeny of two distinct varieties.
4. *Mixed poultry* consists of flocks in which the females are made up of various varieties and crosses, but into which new blood is infused each year by the introduction of males secured from sources other than the home flock.
5. *Mongrels* or *dunghills* are fowls that are allowed to mate indiscriminately year after year, the males being selected from the home flock.

Referring to the above classification, it is probable that more than half of the chickens of the state are mixed; in point of number, the other classes ranking as follows: Pure-breds, standard-breds, mongrels and cross-breds, a very insignificant part of the poultry being in the last two classes.

The behavior of the different breeds as to egg production seems to be more a matter of care and feed than of breed. Of course, the individuality of the fowls enters quite largely into the matter, as the trap nest has repeatedly shown. As a general rule it may be said that the smaller, more active breeds are more prolific layers than the heavy breeds, while the intermediate breeds may be styled general-purpose chickens, combining to some extent the laying tendencies of the lighter with the meat production of the heavier breeds.

In observing hundreds of flocks in all parts of the state, it may be said that as a general rule the standard-bred and pure-bred chickens are given much better care than the flocks of mixed fowls. The pride which the farmer has in a uniform flock whose breed type is to his particular fancy is accountable for this, and this better care is usually the key to the better performance. A uniform flock of poultry is a farm asset. It adds to the attractiveness of the home and to the value of the farm.

THE RESULTS ANALYZED.

Referring to table No. 2, where flock No. 20 yields a net profit above feed and labor of $237.37, or $2.47 per fowl, in comparison with flock No. 16, which nets a loss of $29.65, or 36 cents per fowl, a number of interesting phases of the poultry enterprise present themselves. The flocks were approximately the same size. Both were pure-breds. There was no appreciable loss from disease in either flock. But the situations surrounding the flocks were entirely different. Flock No. 20 was situated in a purely rural community and had complete farm range. Flock

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No. 16 was in the suburbs of a small town and was kept in pens throughout the year. The feed cost per fowl is less in flock No. 20 by 27.2 cents than in flock No. 16, but this feed cost does not include kitchen, garden and orchard waste, farm gleanings, pasture, bugs, insects, worms, etc., which constituted a very considerable portion of the feed consumed by the fowls of flock No. 20, and of which flock No. 16 had but very little. The market price for eggs averaged 4.7 cents per dozen higher from flock No. 20 than from flock No. 16, occasioned by the product from flock No. 20 being sold to a private trade. The labor cost of flock No. 20 is less by 24.5 cents per fowl, occasioned by the different systems of management; but these variations do not make up for the wide difference that exists between the profit of $2.47 per fowl and a loss of 36 cents per fowl. Where the difference is most striking is in the number of eggs per hen. An average of 128 eggs per hen from a flock of the size of flock No. 20 is certainly a very gratifying return, while 43 eggs, which is all that was secured from flock No. 16, is decidedly unsatisfactory.

The individuality of the hens in flock No. 20 undoubtedly had something to do with the results, though no trap-nesting had ever been done. It is quite possible, however, that if the two caretakers could have exchanged flocks results would not have been greatly different. The system used by the manager of flock No. 16 was undoubtedly at fault, at least under his circumstances. However much an analysis of the figures may indicate, they can never tell the whole truth. To ascertain this we must look deeper. The low feed cost of flock No. 20 has been investigated and explained above, but it is in following the cue given us in the low labor cost that we strike pay dirt. This labor cost does not include the time spent "looking at" and "petting" the chickens by the flock mistress of flock No. 20. No more truly can it be said that "the eye of the master fattens the cattle" than that the coddling by the mistress helps fill the egg basket It is not necessarily inferred that successful poultry husbandry is essentially a woman's business; but it is peculiarly true that success with poultry is intimately dependent upon close attention to a very large number of details, the doing of a large number of little things at the right time, and that the management of a poultry "system" requiring an excessive amount of care is not the part of a man with a number of other interests at stake.

The manager of flock No. 16, through the keeping of the records, has discovered his mistake, and so changed the management of his flock that with a greatly reduced number of hens he is now gathering many more eggs than from the larger flock. Indeed, the egg yield per hen has more than doubled, and this year's work promises to yield him a very handsome profit.

Comparing these results with the whole number of flocks considered, we find:

18 farm flocks, average number of eggs per hen	71
12 town flocks, average number of eggs per hen	70
1 commercial poultryman	141
Average for all flocks	76.5

TABLES 2 AND 3.

	Flock No.	No. of fowls.	Eggs per hen.	Value of equipment.	Labor cost per fowl.	Feed cost per fowl.	Value eggs sold.	Value poultry sold.	Total cash receipts.	Eggs used.		Poultry used.		Profit or loss (-) per fowl.
										Number.	Value.	Number.	Value.	
TABLE 2. Results from 18 flocks kept on farms.	1	110	72.4	$25 22	$0 39	$0 607	$98 89	$46 93	$145 82	684	$12 80	17	$12 47	$0 70
	2	115	86	101 75	23	555	112 78	21 77	134 55	1,501	25 01	18	9 20	658
	3	47	66	32 65	36	49	37 49	34 52	72 01	613	10 26	18	12 40	1 07
	5	49	157	20 70	58	536	120 57	7 45	128 02	1,014	19 89	9	5 10	1 58
	6	80	59.8	57 45	46	65	93 00	58 05	151 05	443	9 10	7	2 65	83
	10	83	76	187 75	37	783	66 70	47 50	114 20	1,632	31 79	45	29 75	98
	11	116	75	50 15	20	96	183 72	87 24	170 96	877	20 22	14	9 30	63
	12	309	81	159 00	24	58	217 39	105 22	322 61	2,511	41 85	86	31 10	686
	13	116	95.2	66 00	87	693	127 59	51 03	184 62	388	6 62	20	7 47	673
	15	93	78.8	31 70	15	35	80 09	19 18	99 27	1,374	21 66	10	4 55	1 54
	17	95	91.3	25 00	33	58	88 73	20 82	109 55	956	20 25	25	21 35	88
	18	149	79	156 50	32	51	92 77	90 83	183 10	1,336	21 62	27	13 72	1 45
	20	96	128	50 00	364	526	234 43	53 45	287 88	535	10 37	30	14 40	2 47
	21	118	72	64 65	31	48	105 37	40 63	146 00	809	13 34	27	9 78	623
	22	46	60.4	20 00	23	55	50 89	20 37	71 26	806	12 70	28	8 80	1 04
	25	150	71	75 00	24	55	159 47	14 65	174 12	1,713	26 61	106	39 60	69
	30	370	85	31 95	24	70	341 44	125 79	467 23	1,272	21 32	8	5 25	753
	31	38	66	25 60	40	562	19 13	26 84	45 97	552	8 60	14	11 44	682
Averages	....	121	71	$65 61	$0 28	$0 61	$121 14	$45 67	$166 81	1,056	$18 41	28	$13 76	$0 87
TABLE 3. Results from 12 town flocks and 1 commercial poultryman. Fowls kept wholly or partially confined.	*4	333	141	$401 50	$0 32	$0 81	$783 86	$77 57	$811 48	722	$14 15	29	$8 35	$1 46
	7	87	126	$58 00	$0 67	$1 60	$108 48	$24 09	$127 57	893	$16 31	14	$4 91	$0 56
	8	24	145	65 70	71	84	22 05	1 50	23 55	592	12 10	19	13 53	1 10
	9	30	53	171 45	1 60	1 27	4 77	9 25	14 02	965	19 82	39	20 87	—93
	14	26	128	14 50	1 57	1 45	24 29	89 20	113 49	1,004	19 50	14	8 95	1 64
	16	82	43	42 30	609	798	45 51	25 29	70 80	612	10 44	20	8 85	—36
	19	97	108	74 43	62	1 32	49 36	47 57	96 93	1,793	26 27	72	30 15	—37
	23	28	88	448 35	1 96	2 40	56 54	110 75	167 82	526	9 18	9	4 83	1 21
	24	18	64	24 56	34	63	16 19	4 90	21 09	106	1 62	....	....	09
	26	60	94	36 14	36	74	141 54	23 16	164 70	650	10 91	20	4 00	1 29
	27	48	90	16 35	35	83	24 54	13 66	38 00	1,392	24 54	....	....	76
	28	25	84	6 45	66	1 17	2 50	1 00	3 50	1,872	39 91	24	13 25	90
	29	35	49	104 25	52	78	5 65	1 00	6 65	586	11 16	21	10 05	—48
Averages	....	46	70	$88 54	$0 60	$0 97	$41 36	$29 28	$70 63	916	$16 77	21	$9 95	$0 86

* Commercial poultryman; not included in these averages.

SIZE OF FLOCK AND ITS RELATION TO PROFIT.

Averaging the results from 31 completed records, we find the average number of fowls per flock to be 99. Of these, 18 were farm flocks and 13 city-lot and suburban home flocks. The average size of the farm flock was 121 fowls, while the average of the town flocks, excluding one purely commercial poultryman, was 46 fowls. Taking the average flock as the basis, we find that we have the following profits per fowl:

Average profit per fowl in town flocks of more than 46	$0 26
Average profit per fowl in town flocks of less than 46	44
Average of all flocks kept in town (*i. e.*, wholly or partially confined)	32
Average profit per fowl in farm flocks of more than 121	63
Average profit per fowl in farm flocks of less than 121	98
Average profit in farm flocks (*i. e.*, complete range)	83
Average profit for all flocks	84

The largest number of fowls kept in any town flock was 97 and the fewest 18. Four of the town flocks showed a loss. The greatest loss from a town flock was from flock No. 9, averaging a net loss of 93 cents per fowl. The greatest profit from a town flock was from flock No. 14, consisting of 26 fowls, averaging a net profit above feed and labor of $1.64 per fowl.

None of the farm flocks showed a loss. The greatest profit was from flock No. 20 of 96 fowls, $2.47 per fowl (see flock No. 20 in table No. 2). The least profit was from flock No. 18, of 149 fowls, 14.5 cents per fowl.

Three of the flocks exceeded 300 fowls, from which the average profit was 86 cents.

FEED COST.

The average feed cost per fowl for the 13 town flocks was 97 cents. Subdividing these into two classes, one of which had limited range and one of which had no range, we have:

8 flocks, no range, feed cost	$0 99
5 flocks, limited range, feed cost	87
Difference	$0 12

Comparing again with the farm flocks we have:

13 town flocks, feed cost per fowl	$0 97
18 farm flocks, feed cost per fowl	61
Difference	$0 36

The farm flocks have a feed cost of 84 per cent of the average, in comparison with 134 per cent for the town flocks. The great difference in favor of the farm flocks is attributable to a number of causes:

1. *Gleanings:* (*a*) After the grain is cut the flocks gather large quantities of shattered grain from the ground that would otherwise be absolutely lost. (*b*) Before harvest the flocks often "waste" a considerable amount of grain, also to some extent from the shocks and ricks when the fields are close to the farmstead. This is frequently a source of great aggravation to the farmer, and a principal reason for his considering poultry a "nuisance." It has cost labor and money to produce

the crop, and the quantity wasted, could it be determined, should be charged against the flock. However, is it "wasted"? When a field of rye or corn is hogged off it is not considered "wasted." The part eaten by the poultry, if it can be determined, should be charged against the flock, less the cost of harvesting, thrashing and storing. Indeed, some poultrymen are sowing small fields or "patches" of grain close to the poultry yard and allowing the poultry to harvest it, considering it to be good poultry management to allow the fowls to get their feed in this manner. (*c*) Gleanings from the orchard and garden furnish another important food supply, and largely one of pure credit to the flock, inasmuch as it saves what would otherwise be an absolute waste. A small amount of marketable fruit is damaged, and at times the fowls do some premature "gleaning" in the lettuce beds or flower garden, which furnishes a juster source of aggravation than the gleanings from the ripening grain. The discriminating housewife, however, usually places the blame on the need of repairs to, or the total absence of, the garden fence. (*d*) The rejected cabbages, beets and other vegetables from the garden, if properly stored, constitute an excellent source of green food for use during the winter months. (*e*) The offal at butchering time constitutes a food supply that on many farms marks the time when the hens begin to lay. It probably calls attention to an illy heeded admonition that an insufficient amount of animal food is being provided.

2. *Pasture:* The pasture has been alluded to in a previous paragraph. Grass is a natural and very important part of a poultry ration. Any other form of green food is a substitute for it. The grass consumed by the poultry constitutes a just but as yet undetermined charge against the farm flock. The amount before suggested, 12 cents per hen per year, may be too high or it may not be high enough. It is suggested only as an indication and as a subject of future study.

3. *Weed seeds and insects:* This constitutes a direct overhead credit of undetermined value. The countless thousands of insects, worms and weed seeds destroyed by the fowls during the summer help to restore the balance man has destroyed by the slaughter of the wild birds; and they are also an important food supply. One farmer reports that the chickens by following the plow in the furrow and catching the grubs and cutworms saved his corn crop.

4. *Dairy by-product:* Skim milk, separator milk and curds are largely used in the country as poultry foods. They afford a splendid addition to the ration and one much relished by the poultry. This by-product of the dairy has a money value and should be charged against the flock. However, it is a cheap source of food not usually available to the city poultryman.

5. *Difference in actual cost of grain consumed:* The feed that has been produced on the farm and is consumed by the poultry is charged against the flock at the current price paid at the elevator or feed store or mill, less the cost of marketing, while the town poultryman usually buys in small quantities from the local merchant at a very greatly increased price.

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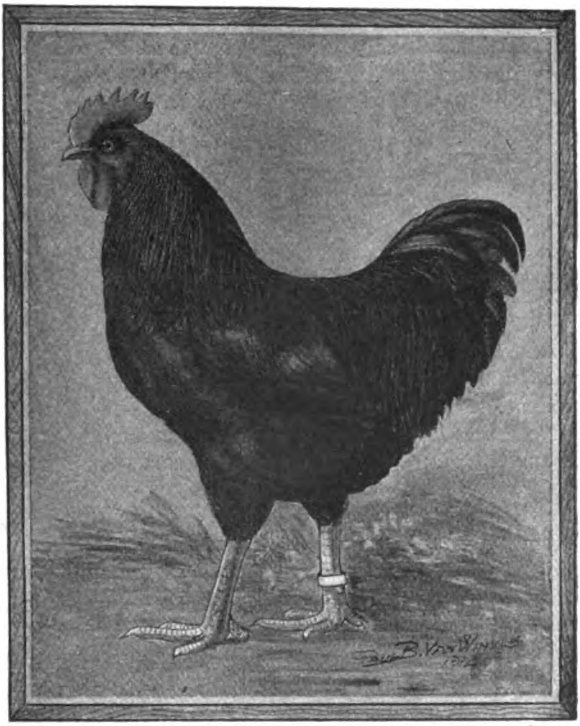

A Partridge Plymouth Rock cockerel.

LABOR COST.

The difference in labor cost between the town and the farm flocks is also significant, largely from the enforced difference in management. Comparing the different situations we find:

18 farm flocks, labor cost per fowl	$0 28
12 town flocks, labor cost per fowl	60
1 commercial poultryman	32
Average of all flocks	37

The above difference is largely due to the disadvantage of the flocks kept wholly or partly confined. It may often happen, however, that the labor incident to the care of the town flocks has its recompense in a little work in the open, a better circulation, a better digestion and a more wholesome outlook, and withal, in the pleasure of having for the table a clean, wholesome product that is the work of one's own hands. Such a consummation may easily make up for any lessening of profits or even for a loss.

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INCOME.

The two important sources of income from poultry are from the sale of eggs and from the sale of poultry. From the 31 flocks considered the results are as follows:

Income from 31 flocks.

	Average per flock.		
	Sale of eggs.	Sale of poultry.	Total.
18 farm flocks	$121 14	$45 67	$166 81
12 town flocks	41 36	29 28	70 64
1 commercial poultryman	733 86	77 57	811 43
Average of all flocks	110 03.	40 34	150 37

Eggs are by far the most important source of income, being 73 per cent of the total. Other minor sources of income are: (1) *Feathers.* There is a good demand for properly cared-for chicken feathers, though the amount secured under usual farm practice is necessarily very small. They are not usually saved. (2) *Manure.* Poultry manure is a highly variable product, its fertilizing value being dependent upon both the kind of feed consumed by the fowls and the method of caring for the product. If the flock is fed liberally of meat scraps, cut bone and other nitrogenous feeds, the droppings will contain a much higher per cent of nitrogen than if grain feeds only are used. It is a very common practice to distribute air-slaked lime liberally in the poultry house under the roosts. This practice is commendable from a sanitary standpoint, but the value of the manure is decreased by the consequent lowering of the nitrogen content. Gypsum, floats or acid phosphate are good substitutes for the air-slaked lime. Analysis of poultry manure differ greatly. Professor Storer, in his "Agriculture in Some of Its Relations with Chemistry," gives this conservative analysis: Water, 56 per cent; nitrogen, 1.6 per cent; phosphoric acid, 1.5 per cent; potash, 0.8 per cent. At present prices of the chemical ingredients this would warrant a valuation of $5.22 per ton. The New Hampshire station, in its annual report of 1908, reports that the roost droppings from 25 hens for the six winter months amounted to 375 pounds. On this basis, each hen produces 30 pounds of manure annually, and 100 hens should be credited with an amount equivalent to 250 pounds of sulphate of ammonia, 300 pounds of phosphoric acid and 200 pounds of kainit, if the manure were all saved and properly cared for. Under prevailing systems of poultry management much of the value of the roost droppings is lost, while a large per cent of the range droppings is of little manurial value from being deposited where not needed. Poultry manure is an ideal dressing for grass. Not a little of the excellence of herbage in the orchards, when fowls are given the run of it, is to be attributed to the manure from the farm flock.

EQUIPMENT.

In the 31 flocks considered, the equipment value varies from $6.45 to $448.35, the average for all the flocks being $89.11. The average of the town flocks was somewhat in excess of the farm flocks.

18 farm flocks, average value of equipment	$65 61
12 town flocks, average value of equipment	88 54
1 commercial poultryman, value of equipment	401 50
Average of all flocks	85 32

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On the basis of number of fowls kept, the average value of equipment per fowl was 86 cents, the town value being $1.63 and the farm value 54 cents. A great improvement is noticeable in the character of poultry equipment over that of a few years ago. However, the old apple tree at the corner of the barn is still occasionally utilized.

MARKETING.

The eggs and fowls of the flocks considered were marketed in various ways, some selling direct to private customers during all or a part of the year, some selling to the local store for cash or trade, some to hucksters at the door, and some shipping to the city market.

Ordinarily, eggs or poultry from the farm flocks are marketed at the country store for trade or for cash, or during the summer months are disposed of to the huckster in exchange for his wares at the door. Those living in or near town sometimes sell to a select family trade at an advance of four to five cents above the market or store price. This practice is not nearly so common as it should be.

The difference in the retail buying and selling price in most small towns varies from two to five cents per dozen, the surplus eggs going to the local egg merchant or commission man or to storage, frequently at lower prices than were paid for them to the producer. This arises from the fact that the general merchants handle country produce (butter and eggs) for the business it brings to their stores, making their profit on the goods sold. There is frequently a trade price at from one to two cents per dozen of eggs above what is paid in cash, while in some localities of the state cash is not paid at all, but duebills, or "scrip," as it is termed, is given for what is not traded out at the time, the eggs in this case passing for money. These various ways of disposing of the product account for the wide variation in the price received for eggs, as shown by the table below. This table shows the average of all the flocks considered for each month from December, 1909, to January, 1911.

An examination of the table discloses that for all the flocks considered for the period covered by the investigation, the farmer received for his eggs within one-tenth of a cent per dozen of the average Cleveland wholesale price for "current receipts." Manifestly, the country merchant must have looked elsewhere for his profits than to the egg trade. Indeed, in some months the average farm price was in excess of the wholesale Cleveland price, notably in December of 1909—average farm price, 33.8 cents; Cleveland wholesale price for "current receipts," 32 cents. The same condition existed in May, June, July, August and December, 1910. The average Cleveland retail price for eggs exceeded the farm price by 4.3 cents, and the fancy price exceeded it by 9.6 cents. The lowest Cleveland retail price was 23 cents, during the month of July, and the highest Cleveland retail price was 55 cents, during the month of January, 1910. The lowest farm price was 15 cents during March, 1910, and the highest farm price was 43.5 cents, during December, 1910. These figures are influenced slightly by the few who sold to private parties. Excluding these, and taking the average of those who sold to the store, we find the average retail price to be 24.7 cents, which is only 1.3 cents less than the average Cleveland wholesale price for "current receipts."

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Period covered by Investigation.	Cleveland price, retail. Cents per doz.		Cleveland price, wholesale. Cents per doz.		Farm price. Cents per doz.			Average Ohio price, 1910.[*] Cents per doz.
	Fancy.	Fresh.	Current receipts.	Storage.	Maximum.	Minimum.	Average.	
December, 1909	45	35	32	....	35	31	33.8	30
January, 1910.	48.3	86	34.1	25.1	37.5	28.5	31.7	31
February	37.3	32	28	24.5	40	21	27.5	31
March	36.7	29.2	23.1	....	33	15.5	22.3	24
April	28.5	26	21	....	23	18	19.7	19
May	27	24	20	....	25.5	17.5	20.3	19
June	27	24	19.5	....	26	17	20.4	19
July	26.7	23.7	18.7	....	25	16	19.4	19
August	27	24	19.6	....	25	17	22	19
September	29.7	26.5	22.5	....	33	18	22.4	20
October	34	30	25.6	....	32	20	25.2	23
November	38.3	34	30	....	40	20	30.1	26
December	48	40	35.8	24.5	43.5	32	36.6	31
January, 1911	44	39	35	25	39	20	32.5	....
Mean for period	35.5	30.2	26	24.7	....	....	25.9	....
Mean for 1910.	34	29	24.8	....	....	....	24.8	23.4

[*] **Year Book 1910, U. S. D. A.**

THE EGG TRADE.

After the eggs leave the producer they travel a long and very devious way before they reach the consumer. The country merchant buys eggs from the producer without regard to kind, color or condition, excluding only checks, *i. e.*, eggs that are broken in bringing to market. He usually sells the eggs which he buys in the same way, *i. e.*, "case count" to the produce man or shipper, who usually "candles" the eggs, *i. e.*, grades them in a dark room before an egg candle, into firsts, seconds, dirties, checks, rottens, etc. He, in turn, disposes of these grades in various ways. During the months of heavy production he may send large quantities of his best eggs to storage on his own account, or he may sell them to the storage houses. He may ship to hotel trade or to commission men or to the retail trade. The produce men usually handle eggs from several counties and ship in car lots. The commission men frequently recandle the eggs and grade them to meet the requirements of their particular trade. A not infrequent route from producer to consumer is: the general store, produce men, storage house, wholesale house, and retailer.

Eggs gathered from the farm are usually marketed once a week or oftener, though they are sometimes held for a longer period for an increase in market price. There is no incentive to take any particular pains in caring for the eggs marketed, as the general store makes no distinction. The general store makes shipments weekly or oftener, according to the supply and market conditions. After reaching the produce men the eggs are handled as rapidly as possible until in storage or in the hands of the retailer. The terms "fresh," "fancy," "No. 1," "storage," etc., of the retail trade are purely trade terms, and do not indicate much with regard to the "freshness" of the product. Indeed, only the poorest grade of storage eggs are usually sold as such. This practice is unfair to the producer, to the consumer and to the storage business. It is unfair to the producer, inasmuch as it makes use of

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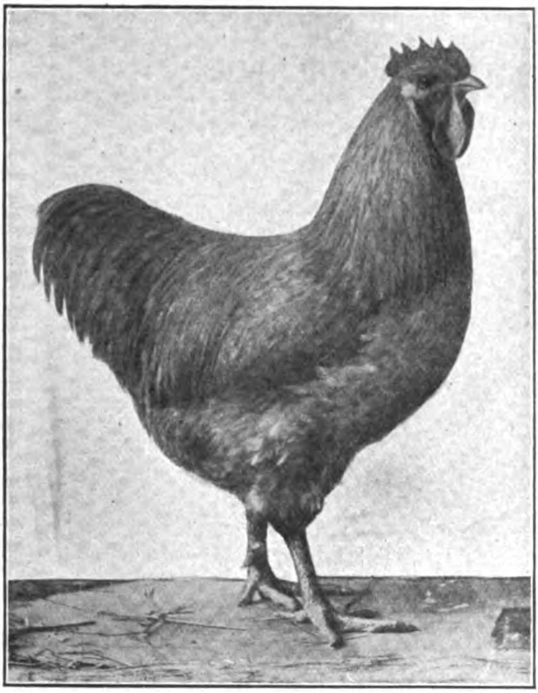
terms intended to convey the idea that the product is received directly from him, and his product is made to suffer by reason of any delinquency of the counterfeit. It is unfair to the consumer, inasmuch as it deceives him as to the quality of the product he is buying, and is unfair to the storage business, inasmuch as the public judges the quality of storage eggs only by the poorest eggs of this class.



A Buff Plymouth Rock cock.

A better and more rational system of marketing eggs is needed—a system that will place this most wholesome food product in the hands of the consumer with the least possible delay and in the best possible condition. Particularly to be desired is the elimination of the present practice of handling eggs by the general stores. Manifestly the general store-keepers can not buy the eggs offered in any other way than that is which they do. The country merchant is after business for his store, and he dare not offend a patron by refusing what is offered, lest competitors secure the offended customer. His method encourages careless, slovenly habits in caring for the eggs by the producer. He encourages holding the eggs until a quantity can be brought to the store at a time, and is himself guilty of storing the eggs in damp, foul-smelling cellars, resulting in moldy, shrunken eggs of low quality.

Through the present method of marketing the producer not only bears

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the brunt of his own sins, but he bears as well all those that have attached themselves to his product on the long route between him and the ultimate consumer. It might seem that under the present system the producer is faring very well, considering, as this investigation shows, that he is receiving practically as much for his product at his local store as it brings after it passes through three or four hands and is transported to a distant market. But this advantage is more apparent than real. The farmer who trades his eggs at the country store for goods at a trading price in excess of what the merchant can get for these eggs after shipping them to market, should know that the price he is receiving for his product is an artificial one, and that the merchant gets the same per cent on the goods he sells whether he pays 16 cents or 22 cents a dozen for the eggs.

A Typical Partridge Plymouth Rock hen.

But the most serious objection to the present system of handling eggs is that the price paid for them, being to a great extent a reflex of the demand, is directly influenced by the low quality of the offering. The consumer who gets a poor quality of eggs from his grocer usually buys something else the next time he goes marketing, and so lessens the demand and decreases the price. Thus the producer suffers for every nest egg, stale or dirty egg that he takes to market, and he likewise suffers for the mold and odor imparted by the loose methods of the general merchant. He suffers for the careless handling of the transportation company; eggs in cases unprotected from the sun on a railway platform or in hot freight cars, which are little less than huge incubators, deteriorate rapidly. He suffers from the misbranding of the eggs in the hands of the retailer. He, more than anyone else, is interested in a more simple and more direct method of handling the product.

A system that will secure the eggs from the producer on a candled, *i. e.*, on a graded basis, so that he will receive a first-class price for a first-class product, thereby putting a premium on freshness and cleanliness, would be most helpful. This, coupled with transportation under carefully guarded shipping conditions and honest handling by the retailers, would result in putting into the hands of the consumer a clean, wholesome, nutritious food product at a price much less than what is now paid for a very indifferent article, and at the same time would increase the profits to the producer.

DIRECT MARKETING.

When eggs can be delivered by the producer direct to the consumer it is an ideal way of marketing the product, and should be followed more extensively than it is; however, only a comparatively insignificant number can be handled in this way. The suburban and city-lot poultryman should certainly stimulate such a trade. Indeed, it is only by so doing that he can successfully compete with the cheaper production under farm conditions.

Marketing through the creamery has much to commend it and has been tried with some success.

COST OF LIVING.

This investigation has developed the following deductions relative to cost of living:

	No. of eggs.	Value.	No. of poultry.	Value.
12 town families each consume per year,	916	$16 77	21	$9 95
18 farm families each consume per year,	1,056	18 41	28	13 76

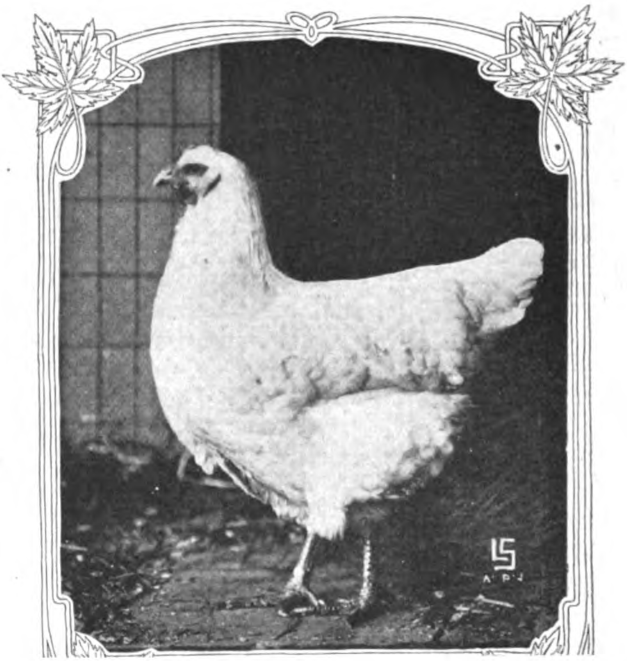
The average size of these families in both town and country was four persons, which included all those who ate regularly at the table:

	No. of eggs.	Value.	No. of poultry.	Value.
Average per individual, town, per year...	229	$4 19	5	$2 48
Average per individual, country, per year,	264	4 60	7	3 44

For this particular food product the cost of living was higher in the country than in the towns. This is attributable to the larger amount consumed per individual on the farm. It is also probable that families living in town and keeping a few fowls consume considerably more both of poultry and eggs than families not keeping them.

SUMMARY.

First. Poultry constitutes a very good minor source of farm income. It should be considered, however, that "profit" as considered in this circular is the net returns above cost of feed and labor; that no rent has been charged for the use of the land, nor have any overhead charges



A White Plymouth Rock pullet.

been included. Both these factors are undetermined, but must be considered before a clear profit can be counted. Under farm conditions the poultry usually have the run of the farmyard, orchard and nearby fields, as we have seen, much to their advantage. It is a little difficult to say just how much the poultry should pay the farm for this privilege. A pasture charge is certainly just. In this investigation we have allowed this charge to be balanced by the overhead credit that was due the flock for the destruction of insects, worms, weed seeds and gleanings from the grain fields, orchards, gardens, etc., that were thus saved and converted into a source of profit. However, before the merchant or manufacturer counts a profit he deducts an overhead charge sufficient to cover depreciation and insurance and numerous accidental sources of loss. For instance, merchants in towns along the rivers, where their stores are subject to inundations by high water, add a "flood charge" to the selling price of their goods sufficient to cover any contemplated loss, figured on past experience. There are a number of such overhead charges incident to the poultry business. One of our coöperators lost his entire flock of young chicks by a destructive hailstorm at a time in the season too late for him to hatch others. Rats did the work of destruction in another flock. Hawks, crows, skunks, weasels, foxes, chicken thieves, roup, cholera, white diarrhea, failure of the eggs to hatch, hens leaving the nest, incubator and brooder trouble, are all factors that directly influence the profit to be derived from the poultry business, and some of which, under farm conditions, are sure to come at some time. Before the enterprise is profitable it must be able to show a clear profit above such incidental losses through a long period of years. To ascertain how much the overhead charges should be will be a part of the future work of this investigation.

Second. Both in town and country small flocks have given greater profits per fowl than large flocks.

Third. Flocks with unlimited range have shown better profits than flocks that were partly or wholly confined.

Fourth. Farm flocks have been more profitable than village or city lot flocks.

Fifth. To successfully compete with the farm flocks, the village or city-lot poultryman must keep high-producing hens and sell at a higher price.

Sixth. Poultry "systems" requiring close confinement of the flock and a large amount of personal attention are out of place on a general farm. The poultry should be incidental to the main business of the farm.

Seventh. Farm and village-lot poultrymen are serious competitors with the commercial poultrymen. The surplus from all these small flocks pours upon the market in a continuous stream, regardless of profit. The commercial poultryman, devoting all his time to the business, sends to the market a product the price of which is largely governed by supplies furnished by his competitors, and to whom the business is only an incident.

Eighth. A better system of marketing eggs and poultry is needed; one which will encourage the production of a high-class product and insure expeditious and careful transportation to the consumer.

Great care must be observed, when newly hatched chicks are removed from the incubator to the brooder, that they are given plenty of fresh, warm air. If the brooder is in the house or cellar, it is generally safe, if a temperature of 90 degrees is maintained, to lift off the top of the brooder and let the chickens seek the hover. The little fellows will see to it that their bodies are kept warm, if they have the chance, but they really must have fresh air to breathe. This stagnation has been the cause of many losses of good hatches after they reached the brooder, and can be easily guarded against by the exercise of a little care.

Be sure about your eggs when you send them to the customer or to the commission man. If you are not sure when an egg was laid, keep it at home, else it may spoil your whole case. Don't save eggs for too long a time in order to make up a certain number for this or that customer. If you do you will have no reputation behind your product, and all your customers will be able to say about you, if he has to use the egg, is to tell the buyer what the grocer told the new housekeeper: "Pardon me," said this newly married girl, "but are these eggs strictly fresh laid?" "Absolutely, madam," replied the grocer; "the farmer I bought them from won't allow his hens to lay them any other way."—*Farm Life.*

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THE FARMER'S FLOCK.

By Wm. E. Thomson, in ***The Poultry Tribune.***

A chick properly hatched and properly raised, if of the American class (such as Rocks, Reds and Dottes), should weigh about two pounds when ten or twelve weeks old. True, you read of systems whereby chicks weigh two pounds when only eight weeks old; but I am speaking of chicks raised in the ordinary way on a farm, but given proper feed and care. Now, do your chicks do that well? Perhaps a few of the early ones will weigh two pounds each when twelve weeks old, but how about the later ones? Did you ever stop and think that it is always the earlier chicks that do better? Of course, you know it is. Now, why? And perhaps a dozen different people will give a dozen different reasons, and I will ask you to consider the reason I give.

Early chicks are the stars. You enjoy working with them. You give them plenty of room. You give them the best feed you have. You give them the best coop on the place. You give them the best care and attention, and, in fact, the best of everything on the place that should be given to little chicks. Those that come later are slighted. You run short of good coops, and they get the poor ones. You even run short of coops of any kind, and you crowd twenty-five or thirty or forty or fifty in one coop and with one hen. And garden making and house cleaning and farm work comes on, and the little chicks are not as cute or as interesting as the first ones, and you neglect them as to care and as to feed and as to water and as to cleanliness. And then you hatch out some more, and neglect them. And the later ones die, and are stepped on and run over by the larger ones, and are starved at one time and overfed the next day. And the lice get on them, and it takes your time to kill the lice and to bury or burn the dead chicks. And those fine, large early chicks. Well, you sell them as early fries, perhaps, and make money on them, or else you save the pullets and some of the cockerels and let them run in the general mass of youngsters, harming and stunting all smaller than themselves and in turn harming and stunting themselves. And many of you, doubtless, consider that the game can not be played any other way. In other words, you believe that such a state is a necessary evil of raising poultry. And the following average is the generally accepted summing up of such a state: one-half of the eggs set will hatch, and one-half of the chicks hatched can be raised. And in spite of the tremendous loss admitted by those statements, I will add another, which I think will be generally accepted by anyone that will study the subject a while, and that is: one-half of the chickens raised are raised at an actual loss.

Can I prove that last statement? No, but it needs no proof. You have chicks hatched in March, April and May. How many of them by the first of December still weigh less than four pounds? And how many of these small, weak, crow-headed creatures die before you can sell them, or before they ever bring in one penny in return for their keep.

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And how many March- and April-hatched pullets do you have that commence to lay during October and November? Early layers pay well, but how many do you have that do not commence to lay until February or March, and then lay very irregularly and for short periods? All these things must be considered. If each of your chickens should demand sixty cents from you, and return only thirty cents, and some nothing at all, you would soon sit up and take notice, even though some returned the sixty cents and some even returned a dollar. And that is what is happening in more than one farm flock. How to prevent it is the next question.

LESS WORK.

Strange to relate, and contrary to the general custom, what I am advocating as a remedy for this deplorable state of affairs is less work than required under the present method.

I would rather hatch 100 chicks and raise 85 of them to fry size, cull out and sell as fries all except the very best cockerels, and all the weak or defective pullets, and raise about 30 pullets and 5 cockerels to maturity, than to hatch 200 chicks, raise only 125 to fry size, sell 50 as fries and raise to maturity 60 or 65.

In the first place, it would require fewer eggs to hatch the chicks, and the percentage of chicks at fry size to the number of eggs set would be greater; there would be less feed and care given and chicks that afterwards died without returning even a part of their cost. I would, more than likely, have my chicks ready to sell earlier than if I had a larger number, and my profit would be correspondingly greater; and the pullets raised to maturity would cost less to raise to that state than those in the larger flock, they would lay earlier and better, and what is important, they would lay when eggs are the highest.

Now, do not mistake my meaning in advocating raising a small number of chicks. But what I am advocating is, raise no more than you have accommodations for. I can care for 200 baby chicks, 50 or 60 grown fowls. Consequently I must sell a great many as fries, culling out all undesirable pullets, and all the cockerels except the very best. Possibly you can care for 500 baby chicks. Then why should you try to hatch 700 or 800 just because your neighbor has that many? Perhaps your neighbor has ample room and equipment for 1000 baby chicks, while your room and equipment is strained to hold 500. And if you can care for 500 baby chicks, how many month-old or two-month-old chicks can you care for? You certainly should be able to care for 400 to 450 easily, or else you will be very foolish in hatching 500 for your own use. Perhaps more than 100 will die. Well, perhaps. But certainly you should not have such a heavy loss if proper accommodations and care is given the 500.

And how about your equipment for mature fowls? Amply large for 100, let us say. Then what is the use of raising more than 100 or 110 past the frying state? None whatever, as you can make as much profit, nearly, and often more, by selling chicks as fries as you can by raising them and selling at market price when grown, especially if you in any wise crowd them when they are growing. And, as above stated, pullets that have had plenty of room and proper care will grow and develop rapidly and commence laying before cold weather. This makes a wonderful difference in your profit, especially if you intend to keep them for yourself. Again, you insure strong, healthy pullets and males, which in turn means more fertile eggs and stronger chicks.

THE WAY OUT.

The only way in which to be sure of early chicks is to use an incubator. And no farmer or poultry raiser (unless he will use the colony house) has any business of using an incubator more than twice in one season. To use it twice means two "batches" of chicks with about four weeks difference in their ages. If you do not use the colony house system, study your equipment and put a low estimate on it for baby chicks; then study your equipment in regard to caring for chicks a couple of months old, and, if necessary, reduce your estimate of your baby-chick capacity. Then buy an incubator that you can reasonably expect will hatch all the chicks you can properly care for in not more than two hatches. Buy or make brooders amply large to accommodate every chick, even if every egg hatched.

By this method, in less than two months you are through with setting and hatching eggs, and in less than another two months you have your chicks fairly beyond the danger line. Both hatches can be early, and fair prices obtained for all fries. You will have less work, it will cover a shorter period, and you will have greater profit.

If you will not use an incubator (you can afford one if you wish to hatch even 100 chicks) you will have to do the best you can in trying to get two or more hens to "sit" at the same time. You also will have to reduce your estimate of your baby-chick capacity if you have chicks coming off at various times, as you can not keep as many in one flock as if all were the same size.

But, of course, you want to hatch more and raise more chickens this year. Why? Just because you want to and want the money they bring in the coming fall. And a baby wants candy just because it wants it and likes it, and does not know that the candy may not be good for it. The baby does not know. And you do not know that there is more money in a flock of forty chickens well raised than there is in eighty not well raised. Of course, if you are on the farm, and the feed does not cost you anything, and your "worser half" just won't give you any money except what you get for your chickens and eggs, etc., and you need money badly, I will not blame you much for trying to raise the eighty in order to get a greater amount of money from their sale, even though they were raised at a dead loss of say ten dollars. You may possibly get a little more, while your husband will never realize how he was buncoed.

Recently I saw a farm flock consisting of old hens, yearling hens, pullets, small cockerels and small, scrubby pullets. All were running together. They roosted in a house that should have had only half as many in it. They were partly fed, the old hens getting too much, the pullets not enough, while some of the smaller ones had to rustle for what they got. Out of the 100 or 125 fowls there were without doubt fully half that during the two months previous had brought no gain by laying eggs, increasing in weight or by nearing maturity, and nearly half that would never pay for their feed from that time on.

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I advised the sale of all except thirty or forty, but the excuse was that they would lay in the spring (when eggs are cheap) and that the eggs were wanted to sell and to use for hatching, and I was certain that many of the hens would not lay enough eggs all summer to pay for the feed they are eating during the winter. And the object of having plenty of eggs for hatching was so that more chicks could be hatched and raised than during the year just past.

A TALK TO FARMERS WHO NEGLECT POULTRY.

By Wm. J. Smith, in *Successful Poultry Journal.*

The writer is well satisfied, after careful consideration, that farmers in general do not get as much clear profit out of their poultry as it is possible for them to get, especially those who do not make poultry a specialty. Speaking of farmers as a whole, a very small per cent make much out of their poultry, not because they are inferior to others in the manner of breeding poultry, but largely because they are careless as to this part of the work connected with their farms. The majority think the business of raising chickens is too small a thing to claim their attention, and the work is largely left to the busy housewife, who, with all her work, manages quite often to supply the family with the most of the groceries needed, and the profit or loss on the poultry kept is seldom counted, so far as the farmer himself is concerned.

If farmers do not derive much revenue from the poultry kept on their farms, it is clearly manifest from more than one standpoint that as a class they are to blame; for it has been proven time and again that there is profit in poultry keeping, and of all classes the farmer has the best opportunity for getting profit out of this line of business. Unlike those who breed poultry in towns and cities, he has ample room for carrying on the business, either on a large or small scale. He can devote as much space to it as he desires, and without disadvantage to other lines of farm work. For the most part, the poultry kept proves a blessing to the others; for in a number of ways the flock helps to increase their profits.

One of these items is the profit arising from the fertilizer gathered from the poultry houses and placed on the soil for the production of different crops. There are few better fertilizers, and if carefully preserved and added to the soil will count greatly in bringing the crops to maturity in the most perfect manner, and figure largely in the profits when marketed.

If all farmers could be made to realize how far the fertilizer procured from the keeping of say two or three hundred hens would go toward producing crops, they would be investing more in poultry and less in commercial fertilizer, remembering that the chickens bring a good profit on the amount invested, not counting the fertilizer at all.

Again, poultry proves a wonderful help in destroying insects which destroy fruit and different crops, and the ever-busy hens not only rid the farmer of these pests, but help furnish their feed at a very low cost. In this day of insect destruction the flock of fowls is almost indispensable, and the farmer is beginning to realize how much he owes to the

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poultry kept on his farm. A neighbor of ours, in discussing the question of plum growing, said he would not think of trying to grow them if he had to dispense with his chickens.

But the poultry of itself assists in no uncertain degree in enlarging the farmer's bank account. The fact is being demonstrated by not a few these days, that with a few hundred hens one man can make a good living for himself and family, when he is compelled to purchase all the feed which the hens consume; and if this is possible, how much more easily can a farmer who raises all his grain, vegetables, etc., make a splendid profit, say on four or five hundred hens? It should also be remembered that the keeping of poultry at a profit will mean but very little more work and will scarcely interfere with the other farm work. To be sure, it will necessitate looking after this part of the business of the farm as carefully as any other department, and necessitates taking as much interest in it as in other things.

It has been demonstrated time and again that a flock of pure-bred poultry will bring in more profit than a mongrel one, and then there is some pleasure in having a beautiful flock on the premises.

POULTRY KEEPING ON A CITY LOT.

By Chas. A. Simmonds, in *American Poultry Journal.*

While the city is not the ideal place for poultry keeping, there are several advantages possessed by the back-lotter that the farm lacks. One of these advantages is ample time to carry on the work. Of course this will not apply to the city man who is in business for himself, but only to clerks, factory employees and others who work eight or ten hours per day and spend the balance of their time loafing or taking some sort of recreation, which class includes a great majority of the city's population. The time these men would spend in caring for poultry would work both ways. It would benefit the caretaker by furnishing him needed mental and physical recreation, and by benefiting the fowls would add materially to his income.

The city man who has no room to keep hogs to eat the table scraps and kitchen waste can turn this waste into valuable food products by keeping a small flock of fowls. As will be explained later, however, one should not attempt to feed the fowls entirely on table scraps, but should give plenty of whole grain in addition.

The greatest problem of the city-lot poultry keeper is a lack of room for his fowls. While poultry has been and is being kept in coops three by six feet with some degree of success, I do not advise this system, no matter how limited the room. Many more layers than breeders can be kept on a given space of ground, as with layers no outside range is necessary, though it is a great advantage in warm weather. Therefore, more profit can be made from commercial poultry keeping on a city lot by keeping nothing but laying hens where one can buy good pullets at a reasonable price in the fall.

I will describe a city-lot poultry plant forty feet square, as this is about the space most city dwellers would have to devote to poultry. The house is forty feet by twelve feet, running the entire length of the north side and leaving a space 40 x 28 feet, which is divided into four runs each 10 x 28 feet. The house is likewise divided into four pens, each 10 x 12, three of which are to accommodate 35 layers each, or 105 in all, from October to July, when they should be culled and all but 60 sold, which will leave but two pens of layers. The fourth pen is to be used for a pen of breeders from the last of February till April 1 and for chicks the balance of the season. The third pen is also used for chicks from July to October, when the cockerels are sold (if not sold before), and the entire house used for the laying hens and pullets till the breeding pen is mated in February. The plan is to keep the hens two years for layers and breeders, which plan requires the replenishing of half the number of layers each season. This requires about 60 good pullets each year, and in order to be sure of 60 good pullets one should set 400 eggs. As it is necessary to keep all the chicks in one flock, they should be as near the same age as possible. By setting a 150-egg incubator March 10 and again April 2, and setting all the hens that become broody during this time (March 10 to April 2), the last eggs will be ready to set by the time the first have hatched, and the breeders can be transferred to the laying pens, and the pen they have occupied can then be used for the chicks till July, when they will be so large they will need another pen. The last of June is generally the best time to sell the hens that have passed their usefulness, as they then bring a good price and the season of high-priced eggs is passed. Likewise, the cockerels should be marketed early in July, as to hold them longer will generally mean a decrease in the net profit they will bring.

Only two of the four yards are used at a time, while the other two are being sown to rye, oats or rape—according to season. The two yards to be used by the breeding pen being sown to rye in the fall will produce oats early in the spring and rape later. The other two yards (being used only during the summer) should be sown to rape early in April, planting in rows twenty inches apart. This will reach a good height by July, when the chicks should be allowed to use their yards the balance of the season and the layers use the yards previously occupied by the chicks and the pen of breeders. The rape being by this time higher than the chicks, the chicks will only eat the lower leaves and the tops will keep on growing and furnish green food and shade all summer and long after frost in the fall.

If the flock is small table scraps may form a large portion of their diet, but, contrary to the claims of some, 30 hens can not be fed "chiefly on the table scraps from a family of five." The table scraps may be fed in a mash of wheat bran, middlings and fine beef scraps, using plenty of bran to make the mash loose, as a mash that is heavy or sticky is indigestible and sure to cause trouble. If the flock is very small, simply mix the scraps with bran and omit the other ingredients. It has been found by experiment that it costs less per pound of meat or dozen of eggs to feed poultry if the mash is fed cooked (mixed with boiling water and placed in a covered pail for several hours before feeding) than where it is simply fed scalded or dry.

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The table scraps or mash should not form more than one-third of the grain ration, as plenty of whole grain is necessary for best results. The grain ration should be varied to suit the appetite of the fowls, and should always be fed to induce exercise. In mild weather it may be scattered on a portion of the yard in the morning and plowed or spaded in (every city lot poultry keeper should own a hand plow or wheel hoe) before the birds are let out of the house. This will keep them busy all day and the plowing helps to keep the soil in the yards pure and sweet.

There is a prevailing idea that white fowls can not be kept clean when confined to small yards, but must have free grass range. It may be they can not be kept clean in portions of the city where the air is laden with coal smoke from factories, but I am sure that most of the trouble is due to neglected care, which results in improperly oiled plumage that collects the dirt. The white fowls on the city lot will be as clean as those on the farm if given plenty of green food and other necessary care, so they are healthy and their plumage is full of life and not dead and fluffy.

The city man who has had no previous experience can not expect to make a great success of poultry the first year, any more than he would at any other business about which he knew absolutely nothing but what he had read. I give this warning in behalf of the culls I have seen raised from eggs costing two dollars apiece. Some people are naturally adapted to poultry culture, while others are not. "Wise men act by reason, the less wise by experience, and others by necessity." A great deal of reason or "common sense" is necessary, as one never has exactly the same conditions twice, and a great real depends upon the peculiarities of the fowls and the season, but the man who enjoys caring for his fowls and finds pleasure in studying them can make money raising poultry anywhere there is room to build a henhouse.

The New York experiment station conducted experiments during the period of a year, in which it demonstrated that a flock of hens will cost less when fed on moistened food than when given food entirely dry; also that eggs can be produced at a greater profit on moistened food than on dry. It was demonstrated that a flock of fowls that was allowed exercise gave better results than one that was wholly confined. The two breeds used were Leghorns and Cochins, and the smaller breed (Leghorns) produced eggs at less cost than did the larger breeds; but considering the cost of raising, and the ultimate poultry value of the hens, the profits are more favorable for the larger hens. The Leghorns ate about two and one-fourth ounces of food (water free) per day for each hen, and the Cochins three and one-fourth ounces. The cost of the food for the whole year varied from 72 cents to $1, and the market value of the eggs varied from 84 cents to $1.24. Where the hens were confined the cost of production would naturally be more than if they were on a range, and the production of eggs would also be smaller, but the experiment gives considerable light on feeding poultry.

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INTERESTING POULTRY EXPERIENCES.

By Prof. G. C. Wheeler, Kansas Agricultural College, in *Kansas Farmer*.

My interest in pure-bred poultry dates back to my boyhood days. My earliest recollections of farm life are those associated with the care of the hens and little chickens. Later I assisted in showing pure-bred Barred Plymouth Rocks at our county fairs, where we were winners of most of the first premiums for several years. Although many of the farmers at that time did not appreciate the great value of pure-bred poultry, our stock was greatly admired, and a goodly number secured stock from us for improving their farm flocks.

After leaving the farm to attend college, circumstances were such that for a number of years I could not have a flock of fowls of my own. I never lost my interest in good poultry, however, and attended all the great shows possible, including that of Boston for two years.

After settling in Manhattan in 1902, circumstances were such that I could again get into the ring as an owner and breeder of pure-bred poultry. I had long been an admirer of the Wyandottes. Their low, plump, compact bodies appealed to me from the utility standpoint as market and table fowls. As a fancier, the combination of graceful curves of outline possessed in such a high degree by all the varieties of this breed when in full feather appealed to me, and as an opportunity came at this time to secure some high-class stock of the Buff Wyandotte variety at very reasonable prices, I again became a full-fledged "chicken man." From that time on I have never had cause to regret my choice of breed. The rich golden buff is a beautiful color, and with the great difficulty in securing just the ideal in coloring, combined with proper form and utility characters, enough zest is introduced into the breeding and mating of the birds to satisfy the most ardent fancier. As table birds, we have become so attached to them that we think nothing can quite compare with a plump Wyandotte, especially when roasted in a fireless cooker and coming to the table with that same rich golden color so much admired in the live fowl. They have been great successes as winter layers; their extremely heavy body-feathering seeming to make them immune to cold, and if given any sort of care at all they will return full value for all feed consumed.

Several years ago an egg-laying contest was conducted at the Kansas Experiment Station, in which six of our pullets were entered. This contest extended from November 1 of that year to November 1 of the following year, and but for the fact that we were so unfortunate as to have selected one pullet having some malformation of the egg-producing organs, so that no eggs at all were produced, this pen would have stood second in this contest. As it was, the five laying pullets of the pen produced enough eggs to beat a number of pens having a full quota of layers. We have always had eggs enough for our table use and have had eggs to sell every winter when prices were highest.

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There is no doubt in my mind but that the income from farm poultry in Kansas could easily be doubled if more attention were given to the use of better stock. Investigations at any market center where poultry is bought and dressed and prepared for consumption will reveal the great inferiority of the stock now being produced. In spite of this marked inferiority, which necessarily means lower prices, the aggregate value of poultry products sold exceeds that of butter. If some account could be made of the large amount of poultry products consumed on the farm, this aggregate value would be much greater.

It is customary for the farmer to regard poultry as one of the small things of the farm and unworthy of his attention. As a result, this large production of wealth from growing poultry which the statistics reveal is largely due to the efforts of the women and children, in many cases struggling along with exceedingly meager equipment and scant encouragement. The town producer of poultry must face higher cost of production, since all feed outside of table waste must be purchased at retail prices.

All my experience since beginning with the Buff Wyandottes has been under town conditions. We have grown from 200 to 400 chickens annually, selling on the market all the stock unfit to go into breeding pens. We have not advertised in any special poultry paper, selling all surplus breeding stock through the medium of advertisement in our Kansas farm papers. We have sold eggs for hatching all around our home locality, and to some extent over the state.

The sale of baby chicks has appealed to us as a more satisfactory method of distributing stock than shipping eggs. They can be shipped with greater safety than eggs, and all disqualifications, such as single comb in rose-combed birds, or feathered or downy shanks in clean-legged varieties, can be detected and culled out. Our first year's experience in selling the baby chicks was so satisfactory all around that we intend to continue this method of selling stock.

We use incubators for hatching, mainly because our hens do not set early enough, and we find the work of hatching with hens is much greater than where the machines are used. Where large numbers of chickens are hatched with machines the greatest difficulty to overcome is that of crowding the chicks too much in the brooders and colony houses. In my judgment, more inferior, poorly developed chicks result from overcrowding than from any one single cause. The beginner with incubators is especially prone to this mistake, since by using good, strong eggs and following directions closely, even the novice can hatch a large per cent of chicks. Ample provision should be made for brooding, and especially for giving much more room after the chicks are a couple of weeks old. It has been our practice to set hens at the same time the machines are started, so as to use hens as well as brooders. We have taken two or three eggs about to hatch and placed them under broody hens, so as to have extra hens willing to take charge of a bunch of chickens.

Success with poultry is a matter of details. Many a man who has found a small flock a great source of profit in proportion to the investment in capital and labor has wondered why he could not make the same

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rate of profit on a flock of 1000. Very few people should attempt to take up poultry as a sole business, but as a branch of the business of farming it is certainly worthy of a great deal more attention than the average farmer is now giving to it. My advice to those growing poultry is to first secure good, pure-bred stock of some breed suited to your fancy and conditions, and then at least give them as good care and attention as is given to other live stock of the farm.

FACTS ABOUT FOWLS.

From *American Poultry Advocate.*

As a result of tests with different breeds, the Pennsylvania Experiment Station gives the following conclusions:

Eggs set about April 1 seemed to produce the highest per cent of chicks. The eggs of the different breeds, in order of their weight, were as follows: Black Minorca, Light Brahma, Barred Rock, White Leghorn, White Wyandotte, Rhode Island Red, White Crested Polish, Buff Cochin. A great deal may depend upon the strain, as it is known that some hens of any breed normally lay larger eggs than others of the same breed.

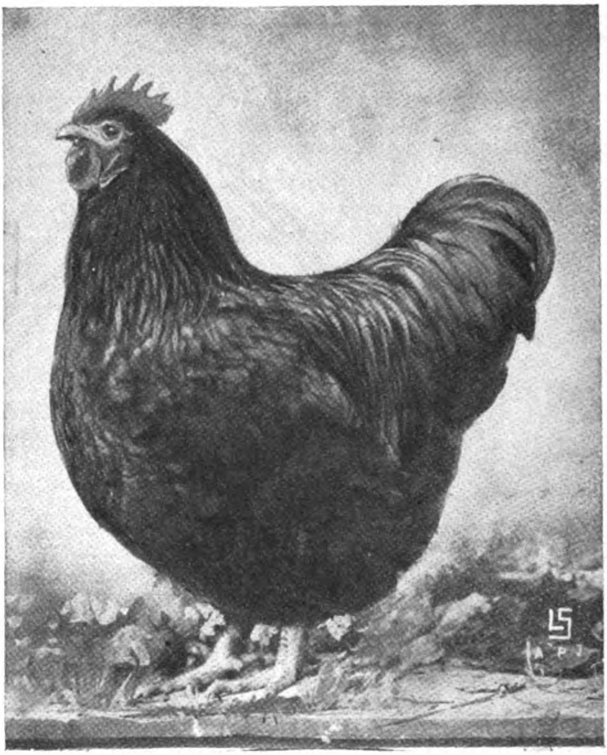
The weight of chicks when hatched does not seem to be in direct proportion to the weight of eggs. Large breeds in general eat more than small ones during the growing period. Early hatched chicks grow faster than late hatched ones. April 1 seems to be a desirable time for hatching in this latitude.

The amount of feed required to produce a pound of gain increases as the chicks approach maturity. Between the ages of six and thirteen weeks, there were required from four to four and three-quarter pounds of feed to produce a pound of gain. Between the ages of thirteen and twenty-six weeks, there were required four and three-quarters to five and three-quarter pounds of feed to produce a pound of gain.

Chicks forced when young do not make so rapid a growth as they approach maturity as those fed a more moderate ration. Chicks weighing less than one pound seem to grow faster on a wet mash; those weighing a pound and a half or more do best on dry feed. The loss among chicks on wet mash was much greater than among those on dry feed, even when weighing less than one pound each.

The slaughter tests indicate that the American breeds dress out better than either the Mediterranean or Asiatic breeds, and that in general pullets dress out better than cockerels. When rather small, weighing less than three and a half pounds live weight, the cockerels of the Mediterranean and Asiatic breeds seem to dress out better than the pullets.

Fodder corn makes fine green food for poultry of all ages. Try it fed green. One of our friends fed silage corn freely to breeding stock last winter with excellent results. Those who have silos should plan to put in a supply of ensilage for the poultry as well as for the milch cattle. —*American Poultry Journal.*



A typical Black Orpington hen.

FOWLS NEVER SWEAT.

From *Southern Poultry Magazine.*

A hen is a queer creature. Fowls never sweat—they have no sweat glands. Don't know it? Well, you' ve lots of company. A fowl's natural temperature is away above the fever heat in all other living creatures, and that makes a draft of air their death warrant. A fowl's body is a regular little engine; the heart beats like a trip hammer and pumps blood like a fire engine. The fowl has nine extra air sacks to help force oxygen to the lungs, and it needs many times more oxygen, for its size, than your horse, which pulls heavy loads and travels fast. All this means that fowls need more air than ordinary stock, for two reasons—they consume more oxygen and they give off all moisture by the breath. Moisture by the breath is very warm and very moist and condenses more quickly than moisture from perspiration, and you must ventilate to the limit to carry it off instead of letting it form a hoary frost on the inside walls of your poultry house. If you don't carry it off look out for trouble in your flock. Houses with open-front, covered with burlap or oiled muslin instead of glass, are all right, because it means ventilation; houses with cracks and knotholes are all wrong, because they mean drafts, which are fatal.

Take it in your own case. Open your bedroom window wide and you wake up in the morning feeling like a fighting-cock. You have had ventilation. Open your window an inch and morning will find you feeling like 30 cents badly spent. You have had a draft, and you sniffle and sneeze like an old plug with the heaves. A draft is a thin stream of cold air, sneaking in through a warmer body without mixing. Ventilation is a body of air that, however cold, comes in a bunch and has volume enough to regulate its own temperature. Drafts are fatal to health in your flock, and health means profit.

DOING THINGS AT THE RIGHT TIME.

From *The Poultry Review.*

There are many people in all walks of life who are always doing things out of season. It is as though they shoveled snow in the summer and cut grass in the winter. This is, of course, the very extreme in comparison, but serves to illustrate the thought. In the spring, when it is time to get the chicks out of doors, they are but building the coops for them, or, if they have them built the year before, they are hard at work cleaning out the accumulations of last season. These coops should have been made in anticipation of the coming brood. They should have been cleaned out last autumn when you were through with them; then they would have been in readiness for the chicks in the spring. The brooder coops should never be left just as you take the last batch of chicks out of them. They should be thoroughly cleaned and disinfected. The ground side should be made free from all litter, and then well spaded and slaked lime mixed in with the soil and both spaded together. The coops will then be ready for the spring's chicks, with the exception of a little brushing up after the winter.

I have even heard of people catching a sitting hen and then looking round for a box in which to set her. With the box in one hand and the hen under the arm, and loudly calling for someone to "bring out those eggs," the process of "setting a hen" begins. It is no wonder that the hen refuses to sit under such conditions. The right thing to do is to make preparations for that hen. Make her a nice, roomy nest in a box, and put it in a fairly dark place with china eggs under her to try her out. Then at night gently lift her from her self-chosen nest and put her in the nest you have made. If she sits nicely during the night and the next day, then that night you can change the eggs for the ones that you wish her to sit on.

Then there are those roosting boards. Some will let them go for a week or ten days or even longer just because it is a disagreeable task. It is, to be sure; but what 's the use? It must be done some time, and surely it is much easier to do it each morning than to wait till the platform is full to running over. The little each morning will take but a few moments, but the accumulations of a week or a month will take some

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little time. Then think of the health of the birds. They have to sit over this all night long. Certainly the air of the house will not be made purer by its being left there for many days. Clean off the roost boards with the same regularity that you feed the birds in the morning. You feed every morning, and every morning the droppings should be removed.

The hen that shows signs of illness should be taken in time. Do not wait till you find her down on the floor of the coop almost dead, but just as soon as you notice any indications of sickness take her out of the pen and do something for her. If you can not diagnose the case, put her by herself so that she will not be tormented by the other birds, and where they can not get the same trouble in case it is contagious. If you can not find out the trouble, at least give her a dose of castor oil and let her alone. Many a puzzling case has thus been disposed of with good results later on. Take the thing in time, and you may save a valuable bird. Wait, and you may have a chance to bury her.

Have a time for doing everything, and then do it at that time. This is applicable to feeding the birds and caring for them. Do things on time, and you will not suffer from neglect. Many a pen has suffered all day from a lack of drinking water simply because the caretaker does not have a regular time for refilling the fountains. He forgot it, with the result that he went to his work and the birds suffered from thirst all the day. Do your work on a systematic plan, and you will find that it is always done and that it is done at the proper time. You will increase the output of your plant and have better-looking birds by giving them the attention they need at the time that they need it.

LIGHT BRAHMAS ARE "COMING BACK."

By E. W. RANKIN, in *Poultry Culture.*

When I say they are "coming back" I don't mean that they are, or have been, out of favor. They have never been "down and out." They are not so popular relatively as they have been at times in the past, and yet they are probably more popular than they were five years ago. They have not been boomed. They are not the "rage," as are some of the American varieties and the Orpingtons, but they have kept on the even tenor of their way, and have maintained their position on their merits as a beautiful and useful variety. They are our oldest variety in this country, and they are here to stay. I do not care to make invidious comparisons. I have no prejudice against any variety. I like most varieties of poultry. But it is safe and fair to say this, that some varieties of less merit than the Light Brahmas are enjoying a greater present popularity.

I don't need to praise the Light Brahma. It speaks for itself. It is the largest of all varieties. It is as beautiful as any other variety, and some of us believe it to be unmatched for beauty. I have heard breeders say that they do not like this or that variety or do not regard it as beautiful. I have, however, never heard a fancier say he did not admire the Light Brahma.

I am glad certain varieties, Barred Rocks, White Wyandottes, Buff Orpingtons, and others, are so popular as they are. I hope their num-

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ber may never grow less, but I am convinced that other varieties than these have equal merits on the score of beauty and utility, and I am strongly of the opinion that the poultry fancy, in the West particularly, would be in better shape if we had a more liberal representation in our shows of other varieties. It is to me a distinct disappointment, on visiting some of our shows, to find a half dozen varieties, or fewer, outnumber all the rest.

Many breeders take up certain varieties just because they are popular, believing that because they are popular the demand for them is great and that therefore birds of these varieties will find ready sale. It does n't always work out that way. The total demand is greater, doubtless, for birds of an extremely popular variety than for birds of some variety of only average popularity. It is also true, however, that there are more breeders handling these popular varieties and therefore more sources from which they can be secured by intending purchasers. One who can produce plenty of Light Brahmas of superior quality will not lack for business if the merits of his birds are known. The leading breeders of this variety, most of them as yet in the East, do not have difficulty in disposing of all the good birds they can produce.

It is quite generally conceded that Light Brahmas are the most aristocratic of all fowls, that when in good form they are of extraordinary beauty, but certain objections to them are sometimes heard. Most of these objections come from a feeling, almost a superstition, that the varieties most popular at the present time are *par excellence* the useful varieties. I am not saying anything against any other variety when I say that no variety is more useful than the Light Brahma.

The objections that Light Brahmas are too persistent setters is amusing to those acquainted with this variety. If there is any valid objection to the best flocks of Light Brahmas it is that they are reluctant setters. I had a pen containing seven females last season. One of them wanted to set twice. None of the others showed the slightest indication of broodiness all season.

Light Brahmas are good layers. A threefoot fence will confine them. Though large, they are active. They are notoriously hardy from the shell up. One Brahma merit was conspicuous during our recent extreme winter. My poultry house is cold, about as cold as outdoors, and yet there were no frozen combs and no colds. Of course, if you don't like big birds, if you don't like to stumble over them when you feed them, let Light Brahmas alone. Size is a merit in a table fowl, and for this reason, in my opinion, the Light Brahma leads all other varieties. The only trouble is, I hate to kill them.

Aside from the sentimental reason, there is another consideration which makes one hesitate about killing Light Brahmas, and that is, that culls are so infrequent among them. It is perhaps an understatement to say that no other variety breeds truer to color. That is because it is an old, thoroughly established variety and not because the colors are easy to produce, as breeders of Columbian Wyandottes and Columbian Rocks know to their sorrow.

There are some things you want in a Light Brahma and some things

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you do not want. There was a tendency recently to get the feathering too loose and too abundant on body and on legs. These are desirable characteristics in a Cochin, but not in a Light Brahma. You want legs and toes well feathered in a Light Brahma, but not carried to extreme. The plumage in all sections should not be too close, but it should be moderately close. I like a Cochin, and in a Cochin I want as much feathering and as loose feathering as I can get, but I want a different type of bird in a Light Brahma. The Brahma should have plenty of length of body, set up on legs of good length. The true Brahma shape, absolutely distinctive and unlike the shape of any other breed, is one element of its beauty. Its plumage, black and white, is no less an element in its beauty. And, of course, you want size in Brahmas. A Brahma without size is an absurdity.

I like "strong" color in a Light Brahma. That is to say, I don't like the faded-out specimens often seen. I like plenty of black in them if the black is where it ought to be and if strongly marked off from the white. And I submit that the striping of the hackle of a really fine Brahma of either sex, with the correct lacing of the tail coverts, give a "dress" to birds of this variety you can not find in others.

THE BRAHMA FROM THE UTILITY STANDPOINT.

By L. E. Keyser, in *American Poultry Advocate.*

The Brahma has exerted a wider influence, perhaps, than any other breed in the building up of our great poultry industry. Since their first introduction into this country the interest in both fancy and utility poultry has steadily increased, and this breed was largely instrumental in first creating that interest.

The Brahma fowl had its origin in India, the first importation being in 1846, coming from the port of Lukipoor. They were purchased by a Mr. Charles, of Connecticut, and the first brood was hatched in May, 1847. In the autumn of that year they were sold to Mr. Virgil Cornish, of New Britain, Conn., and were bred and exhibited by him, attracting much attention on account of their large size. These early birds were light in color, varied a good deal in type, and all did not have the pea comb, which is now a fixed character.

In 1850 a committee at Boston gave them the name of Brahmapootra, but later the last part of the name was dropped and they were called Brahmas. There has been considerable change in the type, and the Brahma of to-day is considerably different from those of twenty years ago. The two varieties were made from the same stock, and among the early birds there were those which were nearly all white. The Dark Brahma was originated by Mr. George P. Burnham, of Boston.

For many years the Brahmas held first place as general-utility fowls. They were good layers and produced an abundance of meat. The chicks were hardy and of fairly quick growth.

For many years Massachusetts chicken growers used Light Brahmas almost exclusively for the production of market poultry for the Boston market, and they were considered the most profitable fowls. The de-

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mands of the fancy changed the breed materially and in a measure affected its utility qualities, so to-day the Brahmas which are used by the growers of soft-roasting chickens are widely different from the Brahmas of the Standard. Other breeds have largely supplanted them for this purpose, as it was found that Plymouth Rocks and some of the other large breeds will lay more eggs and make nearly as much meat in considerable less time, and it is generally recognized that the breed is not of the same value it was years ago.

In hardiness the Brahmas are excelled by no other breed, and there is in them a great amount of reserve strength and vitality. Most of the popular general-purpose breeds carry an infusion of Brahma blood. This is the case, without a single exception, with the American breeds. They all owe much of their value to Brahma blood. For crossing purposes the Brahma is very valuable. Its great vigor is imparted to the offspring, and we have birds that are easy to raise.

The exhibition Brahmas, both Light and Dark, are beautiful birds and command attention wherever shown. The Dark Brahma has never become popular as a general utility bird, owing to the difficulty in breeding it true to feather, and when not carefully bred it presents a bad appearance. While we would not advise anyone to adopt the exhibition Brahma as an economic fowl, we believe that crosses of this breed can be made to good purpose for the production of capons, roasting chickens, and even brown eggs. The older type of Brahma, and that which is mostly used for utility purposes, is not as large or as heavily feathered on the feet as the exhibition birds and run about half a pound lighter in weight.

THE LIGHT BRAHMA.

The Light Brahma is a large fowl of graceful carriage, with a broad, deep and well-rounded breast; the back is broad, rather long and flat across the shoulders, and the tail, which is medium in length, rises rather sharply from the back; the head is medium in length, and broad, surmounted by a triple or pea comb, which is small, the center ridge being higher than that on either side; the beak is yellow, with upper mandible striped with black, and the eye reddish bay. The bird has strong, heavy legs, covered with feathers on outer sides. The skin is yellow, as are the legs and feet. The plumage is silvery white, sharply striped with black in the center of each feather on the neck and saddle hackle; the primary feathers on the wings are black, or black edged with white, and the tail and tail coverts are glossy black; the other parts of the body are silvery white. The standard weights are: Cock, 12 pounds; cockerel, 10 pounds; hen, 9½ pounds; pullet, 8 pounds.

THE DARK BRAHMA.

The Dark Brahma is in most respects the same as the light, with the exception of plumage and weight, being one pound lighter. The plumage of the hen is penciled with white on a dark ground. In the male the head is silvery white; the neck and back are silvery white with a black stripe in each feather; wingbows silvery white; primaries black, with a narrow edging of white; wing coverts black. The tail is black, as is also the body and fluff. This is the same plumage which has been reproduced

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in the Silver Penciled Wyandotte. When bred to standard requirements the Dark Brahma is a most beautiful bird.

GENERAL QUALITIES.

For the villager and fancier, Brahmas, either variety, are desirable fowls. They are very tame and do not fly, so a three-foot fence will restrain them, and they bear confinement well, not being over ambitious to exercise, yet they will pick up considerable food on the range when given a chance. The feathers on their feet and legs being an important feature, they have not been encouraged to scratch, and so this character is not largely developed. They do their best in dry quarters, and lay a large portion of their eggs in winter and early spring.

While as economic fowls for the production of meat and eggs on a commercial scale, the exhibition Brahma can not be strongly recommended. They are well adapted to the villager and fancier, and have many friends even among those who do not breed them. There is no fowl that will give better results when used to grade up a farmer's flock of mixed fowls than the Light Brahma, and where these flocks consist largely of Plymouth Rocks, Wyandottes and Reds of different breeding or grades of these breeds, the result is marvelous. Both size and laying qualities are increased to a marked degree. The early Brahma matured more rapidly than do those of the present day, and when we cross these exhibition Brahmas on more rapid-maturing birds the trait seems to be revived or intensified, and the progeny is often of quicker growth than either of the parents.

Several years ago a friend of the writer's, who was breeding Barred Plymouth Rocks on his town lot, changed to Brahmas. He purchased a fine trio and placed them in a pen with several Plymouth Rock hens, which he saved for layers of eggs for family use and as sitters. Not having a sufficient number of Brahma eggs, he set some from the Brahma-Plymouth Rock cross. The pullets he saved as egg-producers. They were large birds, made a quick growth, and all came back in color. These pullets, he said, were the best layers he ever owned, and they were larger than the run of Plymouth Rock hens.

I have also noticed the effect of the use of Brahma males on mongrel hens, and in every case there was a marked improvement, and there was more uniformity in the offspring than in cases where other males of pure blood were used; so I believe the Brahma is the best fowl to use for this purpose.

We can not get along without the Brahma. We must preserve it in its purity for the making of new breeds and for the uses above cited. The birds which make our large market poultry must carry a good infusion of Brahma blood, for it is from this breed we secure size. They are the largest breed of poultry in existence, and when we want large fowls we must revert to them. They will be preserved and improved by those lovers of fine fowls who are not entirely imbued with the spirit of commercialism. It is in the nature of events that new breeds should come, be popular for a time, and then pass into oblivion. The Brahmas

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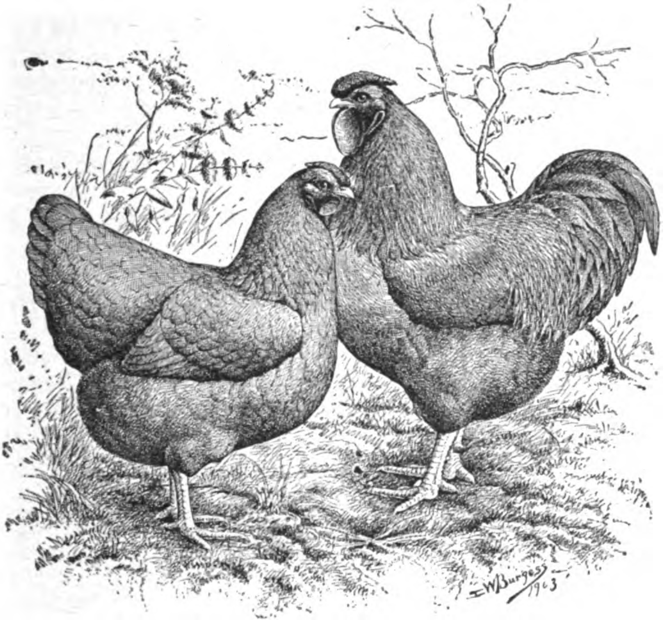
have stood the test of time, being one of our first standard breeds, and while they have in a measure lost their economic value, they will be preserved and continue to be the father of utility breeds.



A pair of Rose Comb Buff Orpingtons.

A PLEA FOR PURE-BREDS.

By Mrs. Ethel Nelson, in *The Poultry Tribune.*

Breeders of mongrel fowls are very apt to feel a dissatisfaction with their multicolored flock when looking over the pure-breds at the shows, and feel a desire for something of better quality than they have at home. The fall or early winter is the best time of the year to get good stock at a reasonable price. Breeders are glad to sell stock then for much less than in the spring, in order to make room and save feed.

It is rather strange, when one thinks of it, that the opportunity to get pure-bred stock at a reasonable price is not more often taken advantage of. When a breeder has spent years, and not inconsiderable money, in bringing a flock up to a high grade of perfection, he has something that, strictly speaking, money does not pay for, and yet some people insist that "a chicken is a chicken." In making a plea for pure-bred fowls, we can not say they will take care of themselves, be free from vermin or stand abuse any better than mongrels. They will eat just as much if given the opportunity. But any flock of pure birds is far more attractive in appearance than a mixed flock, and make a more uniform lot on the market. Having the same characteristics, they make much more uniform growth and, as the variety may be large or small, respond to care and feeding in the same general manner.

We have yet to see a flock of mongrels that will average in weight with any of the heavy or even general-purpose breeds. Of course, if there has recently been a cross with a large variety, the result will be birds of much larger size. This, however, would not be strictly adhering to the principles of mongrel breeding, if principle it might be called.

Occasionally one hears of very creditable feats performed by a flock of mongrels. Perhaps they have outclassed a flock of the neighbor's pure-breds. The owner at once condemns pure-breds and extols his own mixed lot. Was this due to the fact that they were mongrels? Never. Give that man a flock of pure-bred birds of the same age, and let him give them the same care, and then we 'll see which flock responds most kindly to proper care and surroundings.

Is there no satisfaction in having pure-bred stock of any kind on the premises, no matter whether it be sheep, horses, cattle or poultry? Shall we take no pride in anything? And, what is of still greater significance, will we not give more attention to any object in which we take great pride? Profits may be reached in proportion to the *intelligent care* given the fowls. Then if a pride in our possessions leads us to give them better care, by all means let us possess something of which we can be proud.

Look over any flock of pure-bred birds, black, white or parti-colored, and if their uniformity of size and color is not pleasing to the eye there is something wrong with the organs of sight. Better visit an oculist.

There seems to be a somewhat hazy notion among amateurs as to the exact meaning of the terms used to designate young and old stock. A pullet, strictly speaking, is a female under one year old. After she has attained her full maturity she is a hen, but in the trade we speak of a fowl as a pullet until she has completed her first year's laying. Therefore it is correct to speak of her as a pullet until she is eighteen months old, or has begun her first moult. A cockerel is a male bird under one year old, but he is usually spoken of as a cockerel until he has at least entered well upon his first year as a breeding cockerel. Cocks are older males, usually having passed through one season's breeding. If you order cockerels for breeding purposes you will get birds that have not been used for breeding. When ordering pullets you will get females that are under eighteen months, at the most. A cockerel should never be used to breed from before he is a year old. A pullet, if she begins to lay at six months, may be bred from at nine months of age, but she will be better if not bred from till she is one year old. The progeny from mature stock is much more vigorous and of larger size than that from immature stock.—*Farmer and Breeder.*

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POULTRY PENSIONERS.

By Miller Purvis, in *Successful Farming.*

There are two things which reduce the profits of poultry keepers by a percentage that makes a large hole in the poultry revenues of the country, and these two things are found on too many farms all the year around. One of these is poultry pensioners and the other is poultry pests.

To be a pensioner is not considered at all dishonorable or undignified if the pensioner happens to be a human being, a horse or a dog. This may be because we have a reverence for men, horses and dogs after they have lived beyond the age of usefulness and have earned honorable retirement. From my point of view, very few dogs ever earned their board and are pensioners all their lives, or perhaps they might be called parasites or pests—but this is a detail depending on the point of view. Owing to our carniverous habits, the hen is predestined to the pot after she has performed her duties as a purveyor of eggs for her lord and master. The trouble is that a lot of poultry keepers keep their hens right along year after year, sometimes until they die of old age.

It may be safely said that the hen that is kept after she is from eighteen months to two years old becomes a pensioner on the bounty of her owner to a certain extent. Not long ago I had the privilege to study carefully the trap-nest egg record of a very large flock of hens. This record extended over two full laying years for the hens, and had been reduced to such a condition that one could tell at a glance just how many eggs a given hen had laid during the time the record had been kept. I was not very much surprised at it, because I had a pretty firm notion that it is much better to sell a hen when she has laid one full year and put a six-months-old pullet in her place, because the pullet will lay more eggs the year after she begins laying than would be laid by a hen which had passed her first laying year. This record showed that very few of the hens laid anywhere near as many eggs the second year as they did the first year, although there were some notable exceptions to this rule. In no case did a hen make a good record the second year if she had made a poor one the first year. For instance, a hen that made a record of 160 eggs or above the first year was very likely to make a record around 120 the second year; but a hen that made a poor record, say 100 eggs, the first year was very likely to make a still poorer one the next year, although a few that made these low records laid a few more eggs the second year than they did the first.

One could not study this record very long without coming to the conclusion that the record of this flock could have been greatly improved if all the hens had been sold at the end of their second summer, just before they began to molt, and their places had been filled with pullets just coming into laying. It has been found that after the second year very few hens lay enough eggs to pay for what they eat, and are kept at a loss to their owners. It is very far from being a common custom for farmers to sell their hens when they are but eighteen months old, and I have no doubt there are thousands of hens in every state in the Union which are from three to five years old, not one of them having been kept at a profit after the second laying year, and many of them losing money for their owners after their first laying year.

The man who would kill a horse because he had grown old and could be dispensed with because a younger horse could do more and more profitable work would justly be condemned. This would be right, because a dead horse is of no value, as values go. In the case of a hen, fate has decreed that, barring accidents, she shall become food sooner or later, and when she is killed become a valuable article of commerce or a means of subsistence to her owner, and as her fate is decided the day she is hatched, there is no reason, legal, moral or sentimental, why she should not be sent to pot as soon as she reaches the stage where a substitute can do better than she can.

I have not the least doubt that if every farmer in this country would dispose of all these pensioners that have been living on them without paying anything for what they eat, and put in their places pullets just coming into laying, the revenues from the flocks of this country would be increased by 25 per cent without the expenditure of a minute more in labor or an ounce more of feed. Twenty-five per cent of the revenues the country derives from eggs would be a rather tidy sum to get without a cent of cost, and it is entirely within the reach of those who keep poultry in the United States. Any man who was conducting a mercantile business and would deliberately neglect an opportunity to increase his profits by one-fourth at no additional overhead cost would not be considered a very good business man, yet this is exactly what poultry keepers are doing.

Please don't dispute the facts here set down until you have looked your own flock over and estimated how many hens you have that are two years old or over. Get rid of the pensioners and raise more pullets, and, my word for it, you will agree that keeping pensioners in the poultry yard is poor business.

Look out for the big gray louse which hides down in the feathers of the head and neck, close to the skin, and is kept comfortable through the winter by the warmth of the fowl's body. A close search must be made for it. Many hens droop and some die because of the persistent annoyance of this pest, and because its presence is not suspected. The best remedy is grease, melted lard being excellent, which should be well rubbed on the heads and necks of the fowls, close to the skin, two or three applications sometimes being necessary. This is the kind of louse that gets on the early chicks, and we have seen them on the shell of an egg that was "pipped" waiting to give the newcomer a hearty welcome.—*Independent Farmer.*

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CULL OUT THE UNPROFITABLE BIRDS.

By CHARLES SIMMONS, in *American Poultry Journal.*

In every flock of pullets raised there will be some with weak constitutions, others that will not lay at all, and quite a large number that will not lay enough eggs to pay for their feed. These pullets, if kept through the winter, will greatly lessen the profit from the entire flock, and in many instances substitute loss for profit.

Of course, the number of unprofitable birds varies greatly with the breeding and care that the flock receives. A flock of pullets of a good laying strain, a strain that has been pedigree bred for egg production for many generations and that are all of one age, will contain a very small percentage of unprofitable layers as compared with a strain bred with no thought or knowledge as to the egg-producing and egg-breeding ability of the individuals bred from, and where the older chicks are allowed to run with the younger.

Where chicks of greatly varying ages are kept together it is impossible to feed the food best suited to all ages, and the older chicks will worry and torment the younger to a great extent, even where hopper feeding is used.

In culling the chicks many breeders make the mistake in culling only from the late-hatched chicks, keeping all the early-hatched pullets, thinking that they will soon begin to lay and be great egg producers through the fall and winter when the price is high. The wisdom of this course depends greatly upon the care the birds have received up to the time of culling. Only a small per cent of the pullets raised each season lay in the fall and early winter. Spring is nature's breeding season. All wild birds produce their eggs in the spring. Some kinds of birds produce two litters in a season, but the earlier litter never produce eggs before the late, but, being earlier hatched, develop larger frames before beginning to lay.

It is the same way with our domestic fowls when reared under natural conditions. You may hatch chicks in any month from January to October, and unless they are bred for early egg production and are liberally fed on rich, nourishing feed from the time they pip the shell till they reach maturity, you will not get eggs before February, and the late-hatched pullets will begin to lay at the same time as the early-hatched birds. The only difference is that the early-hatched pullets will be two or three pounds heavier than the late ones. This being the case, the late-hatched pullet is much more profitable, as it requires less food to reach maturity than the early bird. The early pullet brings a much higher price in the fall than the late one, but after they are past their usefulness as egg producers there is but little difference in their value. Considering that the spring is the natural laying season, we can get eggs out of the laying season only from an abnormal fowl in an unnatural environment.

Pullets whose ancestors for several generations have been good fall and winter layers, and have themselves been hopper-fed on a rich, nourishing ration since they were hatched, may be expected to begin laying in the fall and continue through the winter. In this case it will be most profitable to keep the early pullets and sell the late ones. In either case only those pullets that are in good health and have strong constitutions should be wintered.

An experienced breeder can tell by the shape and actions of a bird its constitutional vigor and egg-producing ability to a large extent. A pullet with a strong constitution has a short, stout beak, a rich, red eye, bright comb and face, a broad, deep body and thick legs set wide apart. She is not easily frightened and is "boss" of her flock. The pullet having a weak constitution is of the opposite type—long, snake-like head and beak, pale comb, pearl eye, long, narrow body, flat breast, thin legs set close together at the hocks ("knock-kneed"). She is of a wild nature, easily frightened and gives place to the other members of the flock.

Strange as it may seem, the pullet having the strongest constitution is not always the best layer, though a pullet with a weak constitution is never a prolific layer for any length of time. This is probably because the prolific layer to be has expended more vitality in the development of her reproductive organs than the pullet designed to produce but few eggs.

The pullet that will make a good egg record has a small, neat head, a long body, broad and deep behind the hocks. She is the first to come off the roost in the morning and the last to go on at night. She is continually hunting for something to eat and has a well-filled crop. Of course there are exceptions to all rules, but the exception only proves the rule.

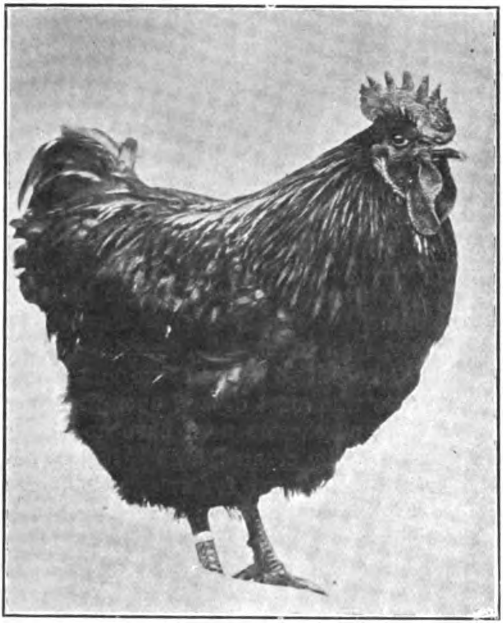
MATING THE FOWLS.

By H. S. Babcock, in *Farm Journal.*

Only the best hens should be used as breeders. And mind the word "hens," for they are better for this purpose than pullets. Hens coming two years old are the best. From the pullets of last year a selection may be made, choosing those that are of good size—not necessarily the largest, however—and as uniform in characteristics as possible.

The selected hens should be in perfect health and should always have been healthy. The trouble with fowls once sick is that no one can be quite sure that they have been cured perfectly, and the weakness or tendency to disease which may lurk in their systems may be transmitted to the chickens hatched from their eggs. How many hens to select will depend upon the number of chickens desired. If the limit is 100 chickens, five or six hens will be sufficient; and the number may be increased or diminished as the number of chickens desired is larger or smaller.

With equal or greater care select the male bird which is to sire the season's chickens. In the choice of the male due regard should be had to the characteristics of the hens which are to run with him. A medium-sized, well-developed cockerel or yearling male is better than a great, overgrown one. For example, a nine-pound Plymouth Rock cock is to be preferred to one weighing eleven pounds. These overgrown males, as a rule, are less attentive to the hens, and do not fertilize the eggs so well as a smaller specimen, and have little to recommend them except their looks. Their chicks are not likely to be any larger, and if they are they will mature so much more slowly that the increased size will cost more than it comes to.



A Single Comb Black Orpington cock.

But, on the other hand, one should n't select a runty male, for such a choice is even worse than the other extreme. And, at any rate, one should look to the females principally for the size of the chickens. Whether the chickens are pure-breds or mongrels, if possible have a thoroughbred male bird. Such as are necessary and suitable for grading up the farm chickens need not cost a great deal.

Breeders of thoroughbred fowls always raise a number of cockerels which are lacking in fine points, especially in color, but which are otherwise excellent, of good shape, robust and vigorous. Such birds are unsuitable for their "fancy" trade, and they are glad to get something more than the market value for them. These are admirable to use on a mixed flock of hens.

An early mating of the fowls selected for breeding is desirable, in order that the little flock may become well acquainted with each other, and so that the eggs may become thoroughly fertilized by the time it is desired to save them for setting.

While an egg may be fertilized in a few days from the first admission of the male bird, ten days or two weeks are not too long to be sure that all of the eggs will be fertilized. How long the influence of a previous male will last is not known with precision, but if ten days to two weeks are allowed after the introduction of the new male, before the eggs are saved for hatching, one is reasonably certain that the chickens will be sired by the last male.

DEMAND FOR CAPONS.

From *Poultry Topics.*

A few years ago capons were seldom found on sale except in some of the more exclusive markets in the largest cities. This was largely because poultryists have only in recent years learned that caponizing insures not only a higher price per pound for their fowls, but an increase in weight for each bird. A capon not infrequently attains a weight of from fourteen to sixteen pounds, or practically twice that of the ordinary rooster of the same breed or same litter, and with other conditions exactly similar. The meat is always sweeter, always tender, and usually just fatty enough to make it of good appearance and readily salable at from four to six cents a pound above that of ordinary poultry.

Even those poultryists who must depend upon the markets of smaller cities or towns for their purchasers need have no fear but that a demand for capons can be readily created, even if it does not already exist. These birds have but to be offered for sale, even in the most remote hamlet. They will sell themselves, usually at any price within reason which one may demand.

The art of caponizing is one not really difficult to master, but despite this it is not learned as generally as one might suppose. It has become the custom in many of the principal poultry-producing sections for the larger buyers to employ experts, who go from farm to farm, performing these operations without compensation, and only with the understanding that their employer is to have the opportunity of purchasing the fowls at maturity, provided he will pay as much as can be obtained from any other dealer.

Fowls need some kind of dust to roll in, as that is nature's way of freeing them from mites. Road dust is the best of all, and the fowls seem to like it best. It requires only a little time to wheel in a few barrels and dump it is some dry place for winter's use. Then arrange a frame about six inches deep and three feet square and keep it filled with the dust. Arrange the frame in a sunny place, as the fowls seem to like a bright spot when dusting. If a bath of this kind is provided, one need never fear mites of any kind. Coal ashes are also good. Wood ashes should never be used, as the lye often irritates the skin, but fowls enjoy picking over them for stray bits of charcoal. A little work now will save lots of worry later on.—*American Poultry Advocate.*

THE KIND OF A POULTRY HOUSE.

By OTIS CRANE, in *The Prairie Farmer.*

There are so many types of poultry houses that it is difficult to say what one is the best suited to the general farmer. J. M. Foster advocates a house 100 feet long and 14 feet wide. He says this is the proper-sized house for 500 hens, which should be kept in one flock. E. R. Philo recommends a coop 3 by 6 feet and says only 6 hens should be kept together in one coop. Both men get results. It is the man as much as the type of house in most cases that insures success.

It is generally conceded by most of the progressive poultry keepers that a satisfactory house should have the following essentials:

1. It must be well ventilated, but free from drafts.
2. It must be dry and sanitary.
3. It must be built at a reasonable cost, and so arranged as to require the minimum of labor in caring for the fowls.

I have used a house for four years that I think fills the above requirements and which has been satisfactory. This house is 14 feet deep and each room is 10 feet wide. Two or more rooms can be built together, thus saving lumber. The house is 8½ feet high on the south and 5 feet high on the north. The foundation should be made of cement, which should extend at least 16 inches into the ground to keep the rats from entering under the walls. A clay or cement floor can be used. The clay floor is warmer, but the cement floor is easier to keep clean.

Make the north, west, and east sides absolutely tight, so tight that no current of air can enter. The south side should have an opening to each room 3 x 6 feet, covered with one-inch poultry netting or sand screen. This will give fresh air, and keep the hens in and the sparrows out. This screen is nailed to a frame and can be raised to put in straw or to throw out the litter. No curtain is used, as it is not needed. This opening should be 3 feet from the ground and extend crosswise.

The north, east and west walls should be lined with some good roofing felt. The sheeting should be solid and covered with a good grade of roofing. Do not forget that all sides but the south must be tight. I use a dropping board 3½ feet wide, extending along the north side, 3 feet above the floor. Two roosts made of 2 x 4 inch scantlings, broad side up, are placed 6 inches above this dropping board. These roosts should be movable.

A shelf can be placed at one side of the room 12 inches from the floor; on this shelf is placed the dry-feed hopper and the water pan. This keeps the hens from throwing straw into the feed and water. The door can be placed in the east side of the room near the south wall. The nests can be made of movable boxes and set under the dropping board. Always have nests lower than the roosts, else the hens will roost on the edge of the nests instead of on the roosts. A hen is high-minded when she goes to roost.

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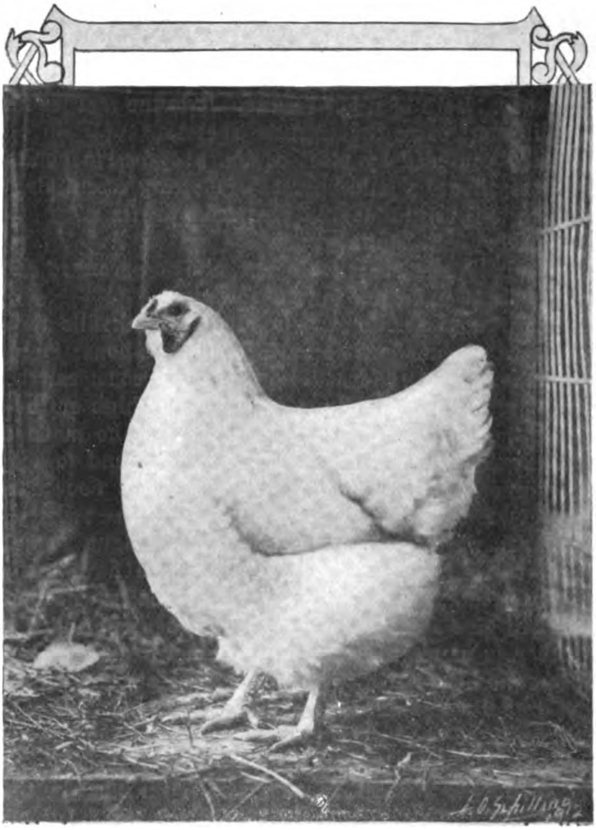
This house is large enough for thirty hens to each room. I prefer two rooms built together, and if more hens are desired build another house in another location. Hens go home to roost, and if a farmer raises only one variety of fowls there is no need of fencing hens in different runs.



A Rose Comb White Orpington hen.

For a whitewash that will not rub off try the following, put on with a broad brush: Slake one peck of lime in boiling water, keep it just covered with water while slacking. Strain through a coarse cloth. Add two quarts of fine salt dissolved in warm water, one pound of rice meal boiled in water to a thin paste, one-quarter of a pound of whiting, and half a pound of glue dissolved in warm water. Mix all thoroughly and let it stand covered for several days, stirring it occasionally. Heat this wash before using and apply hot.—*American Poultry Journal.*

FEEDING NEEDS IN KANSAS.

By Prof. W. A. Lippincott, Kansas Agricultural College,
in *The Farmers Mail and Breeze.*

It takes judgment to feed hens successfully. Chickens have definite needs to be supplied. One is feeding with judgment when he supplies these needs.

There are three kinds of food which must be fed to insure good growth or good egg production. These are fat makers, muscle makers, and bone makers for the hen herself. With the egg, the fat producers will go toward manufacturing the yolk. The muscle-making food goes to produce the white of the egg. The bone makers are found in the shell. Corn is the greatest fattener we have. We can't feed hens successfully without it. Neither can we feed hens successfully on corn alone. On the general farm in the corn belt the tendency is to overdo the matter of feeding it. All too often the chickens have the run of the corn crib and fill up at will.

FOWLS OVEREAT OF CORN.

Now this condition would not be so serious if corn were not such an excellent poultry feed. In palatability and attractiveness it leads the list of the grains of this section. The fowls like it. They will eat as much as they can whenever they can. The result is that other feeds which are necessary are passed by. The hens are in much the same condition as the small boy who fills up on pie and cake. He does n't care much about roast beef and mashed potato.

Corn is a lot more necessary in the ration of the hen than cake is in the ration of young America. If allowed to do so, however, the hen will do just what young America is likely to do. She will overdo the matter.

FOODS FOR YOUNG STOCK.

In raising young stock on the farm one does n't have to figure so very hard to see that they get enough fattening food to keep them in good shape. They'll get it in spite of you. In rearing the young stuff it's growth we're after. The fattening or finishing can come later. We want a lot of growthy, stocky, hustling youngsters that it takes bone and muscle to make.

Two good bone producers which are used a great deal are wheat bran and mealed alfalfa. One or the other should always be before young stock. These should be further supplemented by granulated bone or crushed oyster shell. If possible, at the same time let the youngster have the run of an alfalfa or clover field. From time to time some green cut bone secured from the butcher shop will give variety, act as an appetizer, and at the same time furnish bone-building material.

Muscle-making material is furnished by most of the smaller farm grains. It is not furnished in sufficient amounts, however, to meet the needs of the growing chickens or producing hen.

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FEEDING FOR GROWTH AND EGGS.

In a wild state the domestic hen is naturally a seed or grain eater. She is able to supplement this ration with grubs, insects and worms. In the wild state, however, there is no such rapid growth as we now demand of our early-maturing breeds, on the one hand, nor are there more than one-fifth the number of eggs produced which our modern hen must lay to pay her board and return a small margin of profit. It is necessary, therefore, under these changed conditions to supplement the worms and insects of spring and summer and to replace them during the winter.

The most common way of doing this, as well as one of the most successful, is the feeding of what is commercially known as beef scrap. This is cooked meat ground into the form of a meal, and generally sold in 100-pound sacks. It retails at from $2.50 to $3 per hundred. Having been thoroughly prepared, it has no foul odor and will keep a long time, even in hot weather.

FEED OIL MEAL CAREFULLY.

There are feeds frequently found on the farm which will do almost as well. A small amount of oil meal added to the ration will help. Care must be taken, however, not to overdo the matter, for oil meal, if fed to excess, will produce off-colored yolks that in extreme cases are quite green. It should be added to the ration cautiously and increased slowly.

Gluten is another feed that is excellent for both growing and laying stock. Cottonseed meal is fine, but should be carefully added to the ration of birds which have not been used to it.

For laying hens it will be found a great help if, in addition to balancing up the ration with materials for the shell and white of the egg, some green food is furnished as well. The more forms this is fed in the better the hens will like it and the better they will lay. One way of doing this that is growing in popularity is to sprout the light oats that the hens won't eat ordinarily. This can easily and readily be done by securing any of the commercial grain sprouters or in sprouters of home manufacture. Cabbage, mangel beets and if there is nothing better, alfalfa that has been cured green, boiled and drained, may be fed to good advantage.

The world's record for laying eggs is held by an Oregon Agricultural College hen, according to results of experiments recently published. In fact, there are two hens holding the record, the pair tying, with 259 eggs each, in a year's contest. Heretofore the best record was 251 eggs in that time. One of the birds is a Plymouth Rock and the other a cross between a Plymouth Rock and a Leghorn. The Plymouth Rock laid twenty-seven eggs in October. The cross did not run so high in individual months, but she was more consistent, laying over twenty eggs every month except March. This is a matter of breeding, feeding and care. In the same pen with the record Plymouth Rock there was one which laid but six eggs, although she was of the same breed and received the same care and feed. The trouble was in her heredity. She was a poor individual.

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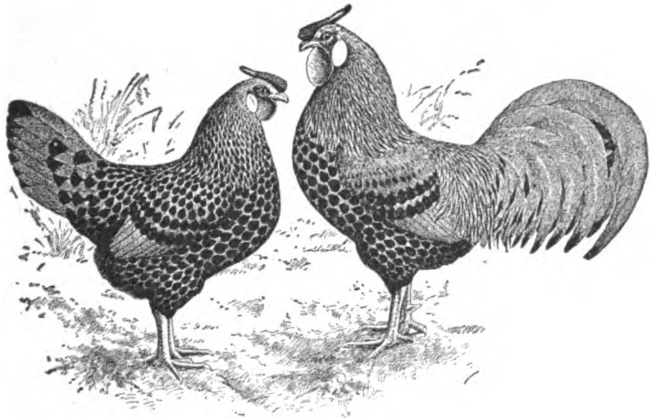

A pair of Golden Spangled Hamburgs.

FEED WHOLE GRAIN TO POULTRY.

By Michael K. Boyer, in *The Farmers Mail and Breeze.*

The Oklahoma Agricultural Experiment Station some years ago made feed trials that are worth calling attention to. They found that poultry digested Kafir corn and corn more completely when the grain was fed whole than when the meal was fed. The Kafir corn and the Kafir meal fed yielded but 2 per cent less total digestible matter than the corresponding corn products. Kafir corn was a more suitable ration, considering only the relative amounts of growth-making and fat-forming materials, than Kafir meal, corn or cornmeal.

Cowpeas were digested reasonably well, and are desirable feed for growing chickens and hens. But little gain in digestibility was secured by grinding the cowpeas. The reason cowpeas are good food for laying hens is that they contain about two and one-half times as much nitrogenous matter as corn or Kafir corn. The production of eggs requires a food that is rich in nitrogen. For this purpose, meat scraps and similar materials are fed. Prof. John Fields said it was probable that soy beans would be better for growing for poultry food than cowpeas, because they give a greater yield of grain and are of very similar composition and feeding value.

George B. Fiske, in *Poultry Feeding and Fattening,* says fowls, even more than any other class of live stock, require variety in their feed. He says none of the single grains is best for poultry. More than other classes of live stock, too, they require close attention and knowledge on the part of the feeder. If hens are fed their grain feed in such a way that they have to exercise vigorously to get their daily feed, they are much more apt to lay than if fed in troughs plenty of prepared feed, allowing them to remain idle.

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CONCERNING THE HEN.

By PROF. WM. A. LIPPINCOTT, in Kansas City *Star.*

As a whole, the hen is rather behind the eagle in the matter of publicity. But when she cackles she 's laid an egg. Or, to put it in terms of advertising, when she 's laid an egg she cackles. And this egg she lays is about the only animal product used for food that comes to the consumer in its own sanitary sealed package. It 's the original "inner seal."

In 1840 the poultry products of this country were valued at 12 million dollars. In 1860 they had grown to 25 million. The poultry products sold last year in the United States brought more than 750 million dollars. Think what it might have been if she had had the influential friends of the eagle and had n't had to do her own advertising. Even at the present rate of progress it is quite reasonable to suppose that the next census will welcome the billion-dollar hen. On the present basis, the output of both gold and silver would have to be increased nearly two and a half times in order to stamp eagles fast enough to pay for the products traceable directly to the hen.

THE MERRY WIDOW HEN.

It may seem that in passing the rooster should be mentioned. Why should n't he come in for his fair meed of praise, or something to that effect? Socially the rooster is a winner; commercially he stands about where a good many men do socially. He is recognized only because he is his wife's husband; and he is a troublesome one at that.

If he would accommodatingly disappear from all farms east and west about the first of May each year and not put in his appearance again until the first of February, he would accomplish a tremendous economic saving and make his name less harshly spoken.

The rooster is a nonproducer so far as direct profits are concerned. If sold at an early age he makes a tender morsel and may barely balance his feed bill. A year later, when he is turned over to the butcher with his good wife, who has in the meantime turned a neat profit on the eggs she has laid, he brings only half as much a pound as she does.

But that is n't all. Contrary to the general notion, egg production is not at all dependent upon the male bird. A widowed hen forgets her grief, crowds her mourning into half a day and lays merrily on. The eggs won't hatch, to be sure; but they will keep longer in hot weather and stand storage or shipment much better than the fertile or hatchable egg.

One, but only one, of the great secrets of putting a fresh egg on the table of the city consumer, in hot weather is keeping the male bird from the laying flock.

THE ITINERARY OF AN EGG.

This egg that the hen lays is a mighty interesting little article when you really get acquainted with it. It turns up in unexpected forms and unsuspected places. When Jackie of our navy sighs for "hen fruit" and is a long way from shore, he takes down a can of yellow powder, mixes it with water and sits down to a very fair omelet. An egg substitute? Not at all. The whole edible egg is there. Only the shell and the water are left "behind." Thirty dozen eggs make a case and will weigh forty-five pounds if they are up to the standard. After having the shells removed and the water driven off by heating, a case will yield nine and a half pounds of egg powder. A single company last year sold the government ninety tons of this powder. The lonely sheep herder on the western range can use it, too. The only difference is that he calls it "cackle berry" and prefers it in chips or flakes rather than powder.

Every egg the hen lays is salable, good, bad and indifferent; that is to say, they are when she lays them. In some states a dealer may be prosecuted for selling sour eggs for human food; so he sells them for something else. Who buys them? The kid-glove maker. He beats his kids in a yolk bath; and it is said that the riper the great, foaming yellow bath is, the better he likes it. The indifferent egg, neither good nor bad, is broken and split. The yolk goes to the low-grade bakers and the white to the paper manufacturers for sizing. Eggs that reach the market fresh and wholesome, but cracked, may be turned over to the confectioner for immediate consumption. The good eggs may be sold in the shell or they may be split and frozen. Some lines of trade want only whites and some only yolks, and want them in bulk. Where they are frozen they may be kept without acquiring the cold-storage flavor, but spoil quickly upon thawing. The shells are among the purest forms of calcium carbonate known to the pharmaceutical trade. After being ground they are often given to babies and growing children to produce bone.

In her wild state the hen is known as the "jungle fowl" and lays about two dozen eggs a year. To be really a top-notcher the business hen of America must lay two hundred eggs or more. At several of the agricultural colleges hens are on record that have crowded the three hundred mark pretty close. This is quite an improvement on nature, and is "going some" even for a hen. In fact, it keeps her so busy that she has turned the balance of her maternal functions over to the incubator and brooder. To keep up with the hen in his section, one incubator manufacturer alone, and there are hundreds in the country, used six carloads of paper in printing his catalogue, and there were thirty thousand pounds of paper in each car.

THE HEN'S ROOSEVELTIAN POLICIES.

The physiological activity of the hen during egg production is remarkable. Take a hen at Cornell University, for instance—not because she is different from a good many other hens, except that her record has been kept. In her first laying year she produced 257 eggs. She weighed three and one-half pounds and the eggs she laid weighed twenty-nine and one-half pounds. To manufacture this twenty-nine and one-half pounds of finished product she consumed 110 pounds of raw material—feed. And financially she is interesting as well. She is a small individual and the profit she turned does n't run very high into dollars, but would look very presentable expressed in percentages. Her eggs were disposed of for table purposes on the local market. They brought $7.43. Her feed for the year cost $1.66, which leaves a balance of $5.77. Interest in the investment and depreciation would be covered by the seventy-seven cents, leaving a balance of $5 for the trouble of feeding her. A hundred such hens would make a nice little side line for almost any business; a thousand might compare favorably with the business itself.

Hens that produce above two hundred eggs a year, however, are yet comparatively rare. The problem of producing them at will is one that the agricultural experiment stations of the various states are still trying to solve. It is a mighty delicate problem—more delicate, perhaps, than any other problem of increased production of an animal food product. The dairyman's problem of increased milk production is one to be approached with care. Milk and cream are by-products of reproduction. The egg is a link in the chain of reproduction itself. In breeding and feeding for increased egg production one often pushes the highly sensitive reproductive mechanism to its limit or beyond.

This lays bare, however, the biggest secret in the successful management of the hen. Big hen production means big reproduction. Any plant, animal or bird will reproduce itself most freely when the conditions surrounding it are the most favorable for the life of the species. It is a law of nature and the hen can not help herself. You may not be able to control the weather conditions of a cornfield, but you can make a hen happy. And there is a lot more truth than poetry in saying that the happy hen is the laying hen. It is just common hen sense. The happy time and the laying time is the spring time. The skillful poultryman, therefore, bends his whole system of management toward duplicating spring conditions the year round. It is the man with the sunny, fresh-air house when the hen can not roam the fields, the sprouted grain for greenness when there is no tender pasture, the dry dust to wallow in when the ground is muddy of frozen that gets the high-priced winter egg. He welcomes bad weather because it means poor production over the country as a whole. General poor production and high prices are always contemporaries.

GOLD BRICKS AND HIGH-PRICED HENS.

Speaking of secrets naturally brings to mind the various systems of mighty secrets by which one can get in on the ground floor by paying from one to ten dollars, buy a few hens, and float to financial freedom. A man so dreaming should invest in straight gold bricks. He will lose his money quicker; it won't be quite so drawn out and painful, and, besides, it will be easier on the hens. Not that all systems are all wrong or all men fail who try them. But it is my observation that most of the people who fail at chicken farming have failed in some other line first. And most of the successes are made by men and women who have grown up on a farm and gradually specialized in chickens, or who have

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first made good in some other line of business requiring great attention to details. A hen farm is a great place for a man who has failed in health while making a success in business. It is a poor place for any one who has failed in business through lack of judgment, no matter what his health is. What such a man wants is a boss.

As a general proposition the country over, the bulk of the poultry business is, and will remain for a good many years, a side line on the general farm. Iowa, Kansas and Missouri, for instance, are three of the greatest states for hens in the Union, according to government figures. Yet farms in these states that have as their principal source of income the sale of poultry products are few and hard to find. In these great agricultural states there are enough hens hanging around the corn crib to total up the masses of millions with which they are credited. If the price of eggs is bad the farmer lives just the same. While this fact remains true, hen farming, in the sense of simply enlarging the present chicken activities on the farm to the exclusion of other lines and selling the products through the regular channels of trade, will remain as it is—a precarious proposition. It is largely a gamble on the weather. A stormy winter in your section will keep your production down. An open winter in mine will keep my production up enough to keep your prices down. Either way is likely to get you. Poor production plus poor prices spoil a man's luck and sour his disposition.

The specialized hen farm means specialized hens and methods. You seldom secure one without the other. "Poor folks have poor ways," and poor stock generally gets poor care. These together mean specialized products for a specialized market. Specialized markets mean customers who have been educated to demand and pay for the extra fancy product. They are generally found in the wealthy sections of the city. They may be reached by direct dealing or through the high-class markets, clubs and cafés.

EGGS IN COLORS.

In specializing the product, fads often enter. In New York, for instance, it is possible to obtain a premium of ten cents a dozen for white eggs as compared to brown eggs of the same quality. That's where the specialized hen comes in. It isn't every hen that lays a large, white egg. Most of them come from the Leghorns or Minorcas. Boston, on the other hand—possibly just because she wants to be as different from New York as possible—will pay an equal premium for brown eggs of the highest quality. These are laid by the American breeds largely, and include the Plymouth Rocks, Rhode Island Reds and Wyandottes, though the English Orpingtons are coming to be looked on with favor in this connection. For extra dark brown eggs the Brahma can be counted on.

In most cities, however, fancy eggs are those that are of good size, naturally clean and really fresh. That sounds easy enough, but one needs only to spend a few minutes at a dealer's where current receipts are handled to realize that good size, natural cleanliness and freshness are very special qualities. Some states have fixed a legal weight for eggs at

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two ounces each, or a pound and a half to the dozen. More should do so, and then enforce it.

A dirty egg can be washed, of course, but a washed egg will spoil much quicker than one that is unwashed. When the egg is first laid it has a mucilaginous coating that seals it as it dries. Washing dissolves this coating and unseals the package, leaving the pores of the shell wide open for the entrance of putrefactive bacteria and disease germs. The way to get a first-class, clean egg on the table of the city consumer is to make it clean through clean methods of production. These are not generally found on the ordinary farm. It is something that takes special pains and brings special pay.

Putting a fresh egg in a customer's kitchen after it is produced is a question of speed and controlled temperature. If the egg is fertile it will begin to incubate at any temperature above 70 degrees Fahrenheit. Such an egg is, of course, not first-class. At the same time, whether fertile or infertile, the contents of the egg begin to shrink the moment it is laid. The cooler it is kept the less it shrinks, to be sure, but it keeps on shrinking, even if it is kept cool. If you will make a tube of heavy paper, about eighteen inches long, having a circumference the same as an egg, put a newly laid egg in one end, your eye at the other, and stand in the sun, you will discover that the contents of the egg fill the shell. Then try another egg that is only a couple of days old, and you will find a well-developed "air cell" at the large end of the egg. The older the egg the larger the cell. Try this on the next dozen eggs you buy, Mr. Cityman, if you are n't getting them direct from the country, and try to figure how many days since they left the nest. The city dweller who has never tasted a prime, fresh egg is in the majority.

Special methods are necessary to produce first-class chicken meat as well as top-notch eggs. These methods are not acquired by observation alone, nor by reading a book, though both will help. A man must approach the business both as a science and an art. The science equals the "why," and can probably be secured quickest at the state agricultural college. The art equals the "how," and can be gotten by hustling in one's overalls on the farm of some man who knows. Here your mistakes are made at the other fellow's expense. This may not be altruistic, but it will save you money. It will help make you over into a countryman as well. A farmer who has never been to town is exceeded in his greenness only by the city man on the farm, even if he is only raising chickens.

For the man of conservative temperament with some capital to invest, who is willing to take pains with both his head and his hands, start small and grow slowly, some parts of the country offer an opportunity for poultry farming that is mighty attractive.

I said in the beginning that, socially, the rooster shines. You have only to attend the next poultry show in your town to prove this statement. It's the prize cockerel that the public showers attention upon, and who climbs into the society columns of the local press. A fancy flock of showroom prize winners, however, has little to do with chicken farming. The rooster that sold at the recent Chicago show for $500 bears about the

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same relation to the production of chicken meat that a 2-minute pacer does to plowing.

Horse racing and chicken fancying are great sports, but they belong among the luxuries. There's money to be made at both if you have the winners. This is particularly true in the latter case, if you are good at advertising and sell your winners. That's how a hen climbed into the picture gallery of a state capitol. In both cases, however, the few have winners and the many do not.

Five hundred dollars for a rooster! And to think that just because there was a lull in interest Burnham wrote a book called "The History of the Hen Fever," clear back in 1855, and thought that he was describing a closed incident.

FACTS ABOUT HENS AND EGGS.

By Michael K. Boyer, in *Poultry Culture.*

While heavy laying is, as a rule, desirable, phenomenal egg records are not a guarantee of strong, rugged offspring. There must be a limit. The hen that lays 150 eggs in a year is doing mighty good laying, and she is not so apt to break down early in life as is the one which is trying to "break the record." Pullets and yearling hens that have done such remarkable work in their first season are not so apt to do heavy work in the second year. As a rule, hens that lay steadily during cold weather are indifferent hot-weather layers. Extreme cold and extreme hot weather affect hens alike. The regular layers give the best-sized eggs, while the spasmodic layer generally produces an assortment of sizes. The size of the egg becomes smaller as the hen increases the number of her product. So, also, does the color gradually change from a dark brown to a light color towards the close of the litter.

The majority of eggs are laid between the hours of nine o'clock in the morning and three o'clock in the afternoon.

There is not very strong fertility in the eggs laid by a hen that will produce from thirty to fifty eggs in succession.

Pullets that delay laying until February are not profitable birds to keep. Those that start in November or early December are the ones to be relied upon for winter laying. On a large egg farm near my home it is a rule that all pullets that have failed to lay an egg by New Year's Day are killed and sent to market. An egg laid in November or December will bring twice as much money as the one laid in March or April.

There is no such thing as an egg-laying type. There is but one true test of the layers, and that is by the aid of trap nests.

Hens forced for egg production by high feeding and stimulants may give the desired number of eggs, but the future generations will show the effect in weak constitutions. Pure food judiciously given is the only material the hardy, working hen needs.

Provide good, comfortable houses, keep them clean and in a good sanitary condition, and there will be no trouble about winter eggs, provided, of course, the fowls are kept strong and vigorous. They must have regular care and the food must be of the purest kind. Egg growing rests not solely with the hen; much depends upon the man in charge.

It becomes quite a study to keep pullets laying regularly. System in feeding has much to do with it. When pullets begin to lay they seem quite uncertain. Some will lay regularly every other day and some only twice a week. Moving layers from coop to coop simply upsets their habits, and they begin all over again to study the new situation, and during this time they usually stop laying.

According to a large number of analyses made of American eggs at the various agricultural stations, an egg, on an average, weighs two ounces and has the following percentage of composition: Shell, 10.5; water, 6.6; fat, 9.3, and ash, 0.9. A side of beef contains on an average about the same percentage of protein, but a larger percentage of fat. Eggs belong to the nitrogenous group of foods, and would naturally and quite properly be combined in the diet with material supplying carbohydrates (sugar and starch) such as cereals, potatoes, etc.

It is said that a plan for supplying the public with fresh eggs is being tried in Germany, in the hope that it will increase the demand for a strictly fresh article. Egg depots are established in the principal cities, at which the quality and freshness of the eggs are guaranteed. For every bad egg the purchaser is entitled to get fifteen good ones. Every poultryman has to mark all eggs which he sends to one of these depots in such a way that they can be traced back to him, and if it is found that he furnished bad eggs as fresh ones he will not be allowed to sell to the depot.

The hardest work in maintaining a constant and continuous egg yield is to keep the laying stock in prime condition, says Col. E. O. Roessle. This means such a condition of perfect health that the eggs will not only be laid regularly but that they will be uniform in size, according to the breed laying them. Under such conditions we should have large eggs from Minorcas, White and Buff Leghorns, Plymouth Rocks and Brahmas. When such breeds lay small eggs, abnormally large eggs, with perhaps double yolks, or soft-shelled eggs, the stock is out of condition and usually overfat. The eggs will thus be laid irregularly and many times laying will stop entirely. Layers should be kept active, and activity is induced by short feeding. A hungry hen is usually a good layer.

Those who know nothing about poultry culture are apt to believe that they can find a fortune in it. At once they invest a large amount of money, not stopping to think that they have no experience. Is it any wonder that they fail? There is a good living in poultry culture for the careful man who will give it the proper attention. Under any other condition the poultry will not even pay their feed bill.

Lice will find a setting hen if nothing is done to prevent it. Keep all nests well disinfected. After a hen has once settled down to brooding nothing will cause her to leave her nest surer than lice. And if chickens are free from vermin to begin with there will be much less trouble in keeping them so, and a lousy chick will not make satisfactory growth.—*Farm Press.*

KEEPING MALES WITH LAYING HENS.

People used to think that hens would not lay well without the presence of a male in the flock. Even yet many believe that the male stimulates egg production to a great extent. Men who have reared poultry for years still cling to the notion and keep a lot of idle males about where only eggs are wanted.

The New York Experiment Station made up four pens of pullets, two of pure-bred stock and two of mixed stock. With one pen of each class cockerels were kept; with the others none were allowed. The cockerels were put with the two pens two months before any began laying. Some pullets in each of the two pens in which no cockerels were put began laying a month before any in the two containing cockerels. The fowls were of the Asiatic breeds and rather persistent sitters. No attempt was made to discourage any of the hens from sitting, and there seemed to be no difference in the relative number of sitters in the contrasted pens. Of the cross-bred pullets, the lot without males laid better throughout the season, and also during the best egg season. Of the other lot the one without males began laying earlier and did better than the one with males during the first part of the season, but it fell slightly behind for the later months, though during that period they kept even with the lot which was accompanied by males. It was thought that the vice of feather eating which broke out in this pen had much to do with the falling off in egg production.

From these experiments it would seem that the presence of males has a detrimental influence upon the egg yield. This is the theory advanced by many in recent years, and it is now pretty generally accepted by prominent egg farmers.

THE MISCHIEF DONE BY THE ROOSTERS.

By W. T. Wittman, in *Poultry Topics.*

We do many things without rhyme or reason. Some of them we do in spite of the fact that we know better. To which of these belongs the practice of having males running with our farm poultry the year round is hard to determine.

Now the fact is, there is no more thorough "pest" or a bigger abomination on the farm than a lot of cockerels running about loose. They should go off to market or be penned separately, just as soon as they start to crow and to shoot red combs. I put "go off to market" first, because it is a sure thing that there is as much actual profit in selling surplus cockerels at a very tender age as there is in feeding and keeping them until they are nearly or full grown. This is specially true up to about August 1. After that date there is sometimes a glut and low prices may continue until after Thanksgiving or even Christmas.

There are strong reasons to doubt if poultry meat in the form of cockerels after they have reached mating age and run with females is ever

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produced at a profit. The sensible thing to do, then, is to market them just previous to that period. They won't be quiet and lay on meat profitably and they won't let anything else in the way of poultry either grow or produce. To repeat, then, the thing to do is to sell them off early and realize the high prices early spring chickens bring.

The old rooster on the farm is annually responsible for at least a $25,000,000 loss of table eggs. This is a tremendous indictment, and the figures are almost beyond belief. And yet all the former is true and the figures likely to be larger even than those given. How does he do it? By putting fertility into eggs that is bound sooner or later, under many conditions market eggs are subjected to, to spoil the eggs.

A concrete example is something like this: You can place an infertile egg in an incubator, and if otherwise the egg is as it should be, it can stay under the incubator temperature, or 103 degrees, for a week and come out as a good, usable table egg. But suppose said egg had fertility in it! The fertility is awakened at a temperature of 90 degrees. This may occur in various ways. It may occur by an over-long retention in the oviduct of the hen laying it; by successive hens following on the nest and keeping the egg warmed up, even by the heat of the poultry house in hot midsummer weather; by standing in the sun on depot platforms for hours awaiting shipment; by overheating in cars; by overheating in the hands of the retailer, or even the consumer, etc. Raising an egg to a temperature above 90 degrees starts a little animal to growing. Removal of sufficient heat causes the unseen animal to die, and the result is what is known in its various stages as a blood ring, a heated egg, a rot, and a spot. If it gets into the hands of the consumer quickly enough it may taste to him merely as a stale egg. And yet this egg may be comparatively newly laid. In the hands of the candlers in the big egg-handling establishments and in the hands of consumers, millions of dozens of eggs are going to smash, into the garbage buckets and into the sewers—at least twenty-five million dollars' worth every year—the fault of the old rooster; or will you blame their owners?

There are only two, or possibly three, months in the year when roosters should run with hens on the farm. These are the months of March, April and May. No chicks should be hatched outside of these months anyhow, and immediately at their close every male chicken on the place should be killed or shut up. It is in July, August and September that our old rooster does the most damage.

Already in some states eggs are bought only from farmers at "loss off." Already there is agitation favoring the passage of laws making it illegal to market fertile eggs. Already one of the first requisites of eggs marketed at fancy prices by large egg farms is that the eggs be sanitary, or nonfertile. Repeated experiments have demonstrated that hens will lay more eggs, be less inclined to broodiness, be more content, be in better plumage and live longer if without the presence of a male. The eggs will be of better flavor, sell for a higher price, be more healthful and sanitary, keep longer and will not contribute to this enormous waste of eggs and money going on because of fertility.

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HOW THE NEEDLESS ROOSTER OCCASIONS A LOSS.

Occasionally experimenters conduct experiments to secure indisputable proof for some truths that have practically been known for some time. This would seem to be the case with reference to some experiments conducted for the past two years by the United States Bureau of Animal Industry. Investigation was made as to the loss among fertilized eggs compared with those that were not fertilized. As a result of investigations, announcement is made that a large part of the heavy losses from bad eggs can be obviated by the production of infertile eggs.

Secretary Wilson estimates that between the producer and the consumer, there is an annual loss of $45,000,000 in the egg crop of the United States, the greater portion of which falls on the farmer, who is by far the largest producer. Of this enormous loss, about one-third, or $15,000,000, is caused by heat which develops the embryo of the fertile egg, causing what is known to the trade as a "blood ring." As it is impossible to produce a "blood ring" in an infertile egg, such an egg will stand a higher degree of temperature without serious deterioration than will a fertile egg.

The Secretary says that if farmers and others engaged in the production of eggs would market their male birds as soon as the hatching season is over, a large saving would be made, as practically every infertile egg would grade a first or second if clean and promptly marketed.

No more simple or efficient method for the improvement of the egg supply of the country could be adopted than the production of infertile eggs. This, of course, is no new doctrine, but now the United States experiments have demonstrated the correctness of this teaching beyond peradventure.

INTRUDING UPON THE HENS.

By John L. Woodbury, in *Orange Judd Farmer.*

We often hear it said, "The more you are among your fowls the better." While this may apply to the raising of young chicks, I am sure it needs liberal qualifying with respect to the laying hens. The excluding of the egg is a delicate process. It depends largely upon the nervous state of the bird, and birds of the smaller breeds in particular like to feel assured of a period of quiet before they set the machinery in motion to deposit the egg. Any intrusion or racket is certain to retard the operation, which is in a degree voluntary. I have known a Leghorn hen, that set out to lay in the morning, to get so wrought up by continued interruptions of a trivial nature that it was late afternoon before she succeeded. Such delay, of course, means not only loss of valuable time for the hen, but a clogging of the work going on among the undeveloped eggs. Pullets, too, when preparing to lay their first egg, almost invariably vacate the nest at the entrance of a person, and may thus easily be driven to lay in the litter, forming a habit which is not always easy to break. For this reason, therefore, I enter the pens only when necessary during the forenoons, when the most of the laying is being done.

It is a well-recognized fact that a change of quarters diminishes the egg yield for a period, but it is not perhaps so generally known that working in the laying pens, for the purpose of making repairs or alterations, is likely to produce the same result. I once did a job of closing in the roosts in a pen of twenty-five pullets which had been laying admirably through December. It occupied about two days. I worked carefully so as not to alarm the birds, and they hovered about me almost constantly, apparently too interested or curious with respect to my work to think of producing eggs. At any rate, their yield suddenly fell off at least 50 per cent, and though I did my best the greater part of January passed before I could bring them out of their slump. Through February they again did nicely. I thought it merely a coincidence at first, but after repeated similar experiences, coupled with the testimony of others, I know to the contrary.

A brother breeder, for another instance, had a high-producing pen of Plymouth Rock fowls. He worked a few days finishing off a bantam pen in one corner of their quarters, and though he placed it at an elevation, so as to take nothing out of the floor space, and was careful to interfere in no way with the admission of sun or light, the fowls promptly took a slump and loiter out half the winter.

THE HEALTH OF THE HEN.

By Mrs. Henry York, in *Farmer's Guide.*

Vermin, germs and improper care are responsible for most poultry diseases. It is true that a large number of the failures in poultry enterprises are due directly to disease and that the diseases are not of a communicable nature, but rather the results of mismanagement, unskilled feeding, and too little attention to general sanitation. It is sometimes claimed that successful doctoring can be done at long range and at a considerable lapse of time, but the bodies of fowls are as delicate and complex as those of other animals and immediate attention and nursing are needed.

Hereditary diseases among fowls are few. Probably the most important is lack of vitality inherited by young chicks as a result of too close inbreeding of the parents. Inherited weakness can not be cured. The poultryman must either begin with new stock or replace some portion of it with new blood, and so breed out the weakness. Very close inbreeding may result in deformed bodies, in deranged nervous systems or in sterility.

Improper feeding with the usual foodstuffs does not cause many diseases, but it may cause loss in the productivity of the underfed or overfed individual. Starvation approaches diseased conditions as extremes are reached. Overfeeding is attended by the most serious difficulties. The fat being deposited to excess in various organs, as the liver, heart or oviduct muscles, weakens them and often ends in the destruction of the fowl. Clean, uncontaminated water aids in dissolving the food, and grit to assist in grinding it should always be at hand. While it is possible that chickens may survive sometimes without grit, it is certain that they grow much better and keep healthier when it is at hand.

Moisture in the henhouse should be avoided, as it is most destructive to the comfort and health of the fowls. The only economical method of doing this is by permitting the inside air to exchange its moisture contents freely with the outside. Fowls contract but few diseases from the yards aside from the parasitic. They are more liable to the effects of improper feeding and the lack of exercise and confinement, but when once they are yarded the poultryman is compelled to supply the feed, water and means of exercise in order to realize his profit. Too frequently no provision is made for protection of the fowls from the cold winter blast or hot summer sun, against which the fowl when allowed free range always chooses sheltered thickets or the shade of some wall or fence. Lice are responsible for many of the so-called poultry diseases. They weaken the hen's vitality and put her in a condition which makes it impossible for her to do well.

The chicken mite is probably the worst single enemy of the average farm hen. It does more damage than the large body lice, and is harder to destroy. No hen can be profitable when infested with these mites. The hen stops laying, the head becomes pale, the bird is a picture of unthrift. The insects work mostly at night, and not only suck the hen's blood but destroy her rest.

Following is a recipe for the destruction of mites. This is dissolved in water and may be sprayed or washed over the wall: Take one-half pound of hard soap and shave it into a gallon of soft water. Put it on the fire and bring it to a boil. By this time the soap will be dissolved. Then remove the soap solution from the fire and stir into it at once, while hot, two gallons of kerosene. This makes a thick, creamy emulsion, which is made ready for use by diluting with soft water and stirring well. If the bucket attached to the spray pump holds five gallons, one-half gallon of the emulsion should be taken and put into the bucket with four and one-half gallons of soft water, and the whole well stirred. It is then ready to be sprayed on the places occupied by the mites.

Heretofore the raising of poultry on the farm has never been considered a part of that institution, and naturally no attention was ever paid to the welfare of the poultry end of it. The hen was a necessary nuisance on every farm, and why she was kept no one ever seemed to know. Her product was marketed and no account taken of same. She lived, she thrived, and is now about to come into her own. The farmer is learning fast that a fine breed of fowls is just as easy to raise as the common fowl, and that his profit from the thoroughbred shows on the right side of the ledger each year. The past five years have shown 50 per cent greater increase in poultry than the first five years of the present century.—*The Feather.*

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HEN FEEDING FOR EFFICIENCY.

By GEORGE H. DACY, in *Farm and Fireside.*

R. C. Lawry, of Pacific, Mo., who manages a large flock of White Leghorns, maintains that the progressive poultryman can not feed any cut-and-dried ration year in and year out, but that he must be continually on the watch for better feeding mixtures, and that, as far as possible, he must cater to the appetites of his hens. The idea should be to feed the flock so that the fowls are kept on feed and at all times relish their grain mixtures. The stock mixture which Mr. Lawry is using at present includes 80 pounds of wheat middlings, 80 pounds of bran, 80 pounds of corn meal, 100 pounds of meat scraps, 15 pounds of oil meal, 9 pounds of granulated bone and 6 pounds of charcoal per 370 pounds of the combination. As the price of the ingredients varies, the character of this mixture is changed, cheaper substitutes being utilized when necessary.

All the green stuff is home grown, and comprises soiling crops of mangels, beets, turnips, rye, alfalfa, rape and sorghum, which provide a varied menu of succulent roughage with which to tickle the palates of the hens. To a large extent the fowls are allowed to harvest their own supplies of this green feed, as they are ranged over the fields of growing grain, and in this way they obtain plenty of exercise, which maintains them in the pink of breeding and productive condition.

Inexpensive by-products of other industries, such as stale bread purchased from city bakeries, and inferior rice and oatmeal which do not come up to market requirements, are purchased and fed to the Lawry flock. Dried stale bread is purchased in large quantities at one cent per loaf, while loose rice and oatmeal cost one cent per pound. In addition, buttermilk is shipped in at a cost of a penny per gallon, and when used as a moistener for the dry mash, the hens fight for it. A grain ration, which embraces 70 pounds of corn, 50 pounds of wheat, 35 pounds of oats and 15 pounds of Kafir corn per 175 pounds of the mixture, is also employed to good effect in inducing these hens to continuously yield a bumper crop of eggs.

The farmer may be well educated along the different branches of agriculture—more so than his city cousin—but the city cousin has stolen a march on the farmer when it comes to raising good poultry. If the farmers of the United States could realize the possibilities of the poultry industry as a means for them to enrich themselves they could better not only their own condition but that of mankind in general.

As a rule, the farm poultry is left to shift for itself, no thought being given it except to gather the eggs and later wonder why they don't hatch. It is not given a third of the chance afforded the other branches of the farm work, while with only a little care and attention it would return as much profit. Why it is, is one of the unanswered puzzles of modern times.—*Independent Farmer.*

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BREEDING FOR EGG PRODUCTION.

By L. I. FAIRMAN, in *The Poultry Tribune.*

I have seen and read so many remarks on the main experiment in egg production, and the main point to most people seems to be that the 200-egg hen will not reproduce herself. I have had several that went over 200 at first, and I found this to be true; but by keeping right at it I believe I have located the trouble. I found that the 200-egg hen would produce 100-egg pullets. One of my hens laid 225 eggs, and her pullets were failures as big egg producers; but I bred her the next year, and as a two-year-old her pullets were a great deal better, and out of this lot was a pullet that produced 249 eggs. Her pullets the first year were failures, but the next year the pullets she produced were 75 per cent better in size and egg production. Then I mated her the same way the past season, and her chicks this year are better in every way. I explain this improvement this way: The first year she produced 249 eggs, which was such a strain on her vitality she was unable to give to her descendants her great qualities as an egg producer. The next year she produced 183 eggs, and this being a less strain, she could give more to each chick; and the last season, by producing only 142 eggs, she was able to do still better in imparting vitality, and I am looking for some extra-large producers from these last pullets. Pullets hatched after the middle of June are now beginning to lay (January 1).

The idea I wish to impart is this: The 200-egg hen can not produce 200 eggs per annum and give her chicks the vitality necessary to make them also producers of 200 eggs; but she will do it if you keep her until she produces only around 150 eggs; and hereafter I will keep all 200-egg hens as long as they produce an egg in the breeding season.

HENS AS EGG MACHINES.

From *Farm Press.*

I am a great believer in getting as many eggs as possible out of fowls during the first twelve months of their laying career, and I have proved that, to make fowls really profitable as producers of eggs solely for eating, they must be transformed into laying machines by the aid of gentle forcing from the time they deposit their first eggs until they moult, but it must be remembered that such birds are intended solely for the production of eggs, and not for future use as breeders, and that they were the offspring of recorded layers, bred and fed under rational conditions.

If we are to maintain stamina in our fowls we should use no artificial methods to induce them to create egg records that may look well in print, but they are records that will die with their producers. We do not want meteoric records, but records based on a healthy strain of fowls that have been bred, fed and kept under rational conditions. Such records, and only such records, are calculated to impress for good the future generations. If forcing is done at all, let it be with birds drafted from the rationally managed stock, and when their egg producing fails they should be killed and sold for the table, and not sold alive so that they may perchance be bought and bred by some poorly informed or careless breeder, and thus infest the country with the forerunners of degenerate races of fowls. No wise gardener would dream of propagating from plants that had been forced to produce fruit or flowers out of season, and no wise poultryman whose aim is a firm basis for future operations would think of breeding from birds that have been forced to produce eggs to a greater extent than they otherwise would have done under rational management.

Tonics—that is, harmless tonics—are good at times when given to rationally fed fowls. The healthiest birds are liable at times to become run down, especially during the breeding season, and a little good tonic given at the right time acts as a corrective, even as a "pick-up" revives the tired man. But to make use of tonics and spices indiscreetly, with the object of securing high egg records, is equivalent to thrashing up a horse so that the passenger may catch his train. The object in view may be achieved, but the poor horse invariably suffers.

It should be the aim of all who have the future welfare of the poultry industry at heart to move studiously and cautiously in building up laying strains, so that the country may maintain its reputation as the home of healthy fowls, capable of producing eggs without the assistance of highly stimulating concoctions. Fowls rightly bred, rightly fed, and rightly handled respecting shelter and cleanliness, need no coaching in egg production. Such birds stimulate themselves by resorting to the haunts of the most cunning insects and the litter that hides the tiniest seeds.

RELATION OF AGE TO EGG YIELD.

From *Poultry and Bees.*

In the accompanying diagram is shown a geometrical illustration of the egg production of 60 fowls during their first, second and third years at the Maryland Experiment Station. According to C. L. Opperman, the high average made during the pullet year is due to the fact that the birds were selected for this experiment after they had completed their pullet-year record. They had, however, at no time been bred for egg production, but were selected from a flock of 240 White Leghorn fowls hatched from eggs procured from a farmer in the state. The object in selecting good performers was to determine, if possible, whether such birds would show a marked decrease in egg yield after the first and second years.

During the pullet year the fowls produced 10,280 eggs, or an average of 171 eggs a hen. The market value of these eggs at an average price of 25 cents a dozen is $214.16. The cost of maintenance for the year, exclusive of labor, amounted to $90. The profit determined by subtracting the cost of maintenance from the gross receipts is $124.16 for the entire flock, or $2.07 a hen.

In the second year there is a decrease of 1337 eggs. This means a

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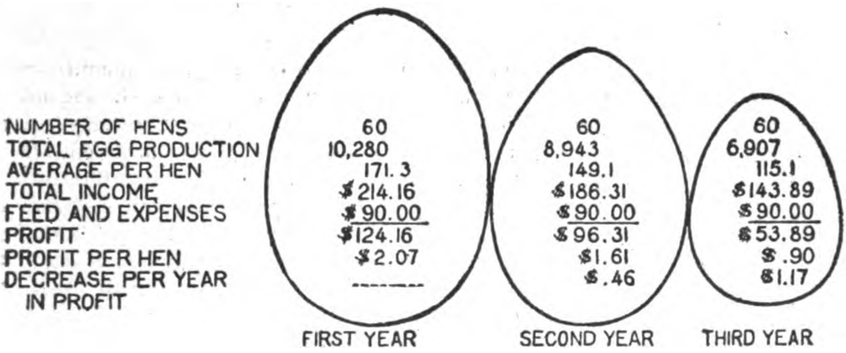
shrinkage of 13 per cent and a loss of 46 cents a hen, or a total loss of $27.60 for the flock. Such a decrease, however, is not great enough to warrant one in discarding fowls after the first year. It must also be borne in mind that during the second year the birds are more mature, and consequently are better fitted to be used as breeders.



	FIRST YEAR	SECOND YEAR	THIRD YEAR
NUMBER OF HENS	60	60	60
TOTAL EGG PRODUCTION	10,280	8,943	6,907
AVERAGE PER HEN	171.3	149.1	115.1
TOTAL INCOME	$214.16	$186.31	$143.89
FEED AND EXPENSES	$90.00	$90.00	$90.00
PROFIT	$124.16	$96.31	$53.89
PROFIT PER HEN	$2.07	$1.61	$.90
DECREASE PER YEAR IN PROFIT	--------	$.46	$1.17

Diagramic illustration of annually declining egg yield.

As has been mentioned above, a shrinkage of 13 per cent was manifested during the second year of the experiment. This decrease, while not large enough to bring about serious financial loss, is but the average of 60 selected birds. It will be of practical interest to note the shrinkage in the egg production of a general flock of 240 fowls as compared with 60 selected birds. In the first year there were 30,451 eggs, in the second 27,441. This is a decrease of 8.5 per cent. One can see at a glance that in this case the shrinkage in the general flock which has had proper conditions of housing and feeding is slightly less than it was in the case of 60 selected fowls. These figures strengthen the assertion that the decrease in egg production during the second year is not great enough to keep one from realizing a good profit.

In the third year the 60 fowls produced 6907 eggs, or an average of 115 eggs a hen, a shrinkage of 32.2 per cent as compared with the first year's production, or a decrease of 56.2 eggs a hen. This means a financial loss of $1.17 a hen, as compared with the first year's profit, or a total loss of $70.20 for the flock of 60 fowls. It is doubtful if the average farmer realizes that practically all the fowls over two years of age (and there are many thousands of them on the farms) are being maintained at such a loss.

True, in many instances the farm fowl is virtually compelled to forage for the greater part of its living, and if "biddy" manages to produce from 40 to 50 eggs during the spring months the farmer figures that it is clear profit for him. While we can not but admit that this is true, does it not behoove the progressive farmer of to-day, if it is within his power, to realize a profit of $1.50 a hen on birds between one and two years of age, instead of 40 or 50 cents a hen on old stock?

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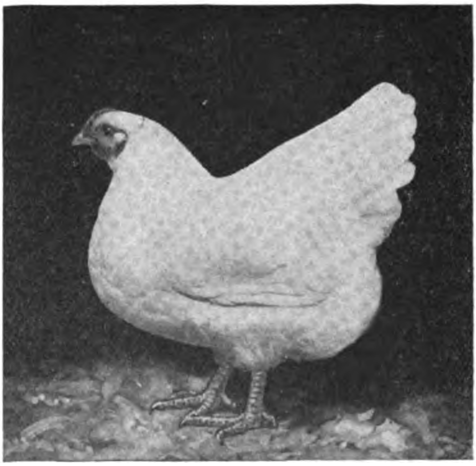
CHIEF CAUSE OF NO EGGS.

By H. M. Cottrell.

A dozen fair-sized eggs contain a pint of water, and large quantities of water are constantly being used and afterwards secreted in the digestion of food and the performance of active life. Water is in ceaseless demand in the hen's body and is as essential as feed. Many well-fed hens do not lay because they do not have the water necessary in the formation of the egg. Lack of water is the chief cause of hens on the farm not laying in winter. The water must be clean, pure and palatable and within the reach of the hen whenever she wants it. She will not drink enough if the water is lukewarm in summer or if it is mixed with ice in winter.



A White Wyandotte hen.

LAYERS MUST HAVE VARIETY.

The hen must have a variety to lay well. Wheat is a good basis for the grain mixture, and where it is cheap enough may form one-half the total weight of grain fed. Corn, oats, milo, Kafir, barley and a little millet may be fed in convenient mixtures to make up for the other half. Field peas make most excellent feed for laying hens. Peanuts can be fed in small quantities to advantage. The best results will be had where four to six varieties of grain are fed, as a large variety in the feed mixture makes the appetite sharp.

Every particle of feed given the hen should be clean enough to be eaten by human beings. Moldy and rotten feeds often bring disease, and tainted feeds are likely to taint the eggs and flesh.

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ALFALFA THE BEST GREEN FEED.

The very best green feed for hens is alfalfa, green alfalfa in the warm months and alfalfa leaves in the winter. Alfalfa leaves are richer in body- and egg-making material than oil meal. Alfalfa is palatable; it keeps the bowels in just the right condition for promoting good digestion and health. It is rich in both protein and mineral matter, the two essential materials for growth and for eggs.

Clover is next to alfalfa in feed value, and the grasses follow. Cabbage is good. Many poultrymen raise lettuce just for hen feed. Lawn clippings are relished. Beets and mangels are relished for a variety. A hen should have all the green feed she will eat every day of her life.

MEAT FOOD IS NECESSARY.

The hen running around the farm in the spring is well supplied with meat through the bugs and worms she eats, and accordingly she lays well. Ordinarily grains do not supply sufficient protein for many eggs and the hen must have a daily supply of meat in some form. Raw bone and cut meat is good, but requires a great deal of labor, and, unless the poultry growers are careful, is likely to become tainted—sometimes so badly as to kill the hens. Dried meat meal and dried meat and bone meal, kept sweet, are largely used. This feed must be kept in a cool, dry place. Many trap rabbits and feed the meat from them to their hens. When a hen has plenty of grain, grit and lime in shells she is not likely to eat too much meat if she has a daily supply of it. Where hens have gone a long time without meat they are apt to eat so much that sometimes they ruin themselves permanently and never lay again.

ALAFLFA MAKES LAYERS.

By E. Robinson, in the *Agricultural Epitomist.*

I have proved to my satisfaction during the past year that alfalfa excels clover both as a green food for growing chicks and a winter relish for adult fowls. We have a field of ten acres sown to alfalfa stretching just below the colony coops and pens where I raise my chicks. A year ago last summer I noticed that as soon as I gave the chickens free range they would seek the field and spend hours in the growing alfalfa, particularly when it was in blossom ready for cutting.

By close observation I found that they ate the tender tops and purple buds ravenously, and certainly seemed to thrive on the food. I tried sowing some seed in my nursery pen, and it was wonderful to see how the chicks enjoyed it—wee, fluffy fellows just from the incubator. This set me to thinking. When last winter came on I housed 100 pure Buff Cochin pullets in a fairly roomy and comfortable house. The large hay barn was stored to the roof with alfalfa and millet hay. From the former the leaves and dried blossoms, still green in hue, fell in masses in fine fragrant litter, useless to the cattle and horses, which only ate the bulkier stems.

All winter long I used this alfalfa chaff for litter in my houses, bedding the floor deep every day. The hens scratched in it for their grain and ate every available bit they could pick up. By night the floor would be bare and a fresh supply was thrown in ready for the morning meal. My hens have always done well as winter layers, but last season they outdid themselves and made a record which is the wonder and envy of all my neighbors. I give the credit to alfalfa, especially since some close neighbors with warm houses—one of them heated—who bought protein and blood meal in large quantities, and who provided oyster shells, mica grit and cut clover, got next to no eggs at all.

In fact, the one who has the heated chicken house did not average three eggs a week, and the other barely got enough for family use. One has a flock of 500 Brown Leghorns and the other 250 pure Barred Rocks. In past winters eggs from my old hens have been few and far between. It was the pullets that laid the eggs; but not only did the hens lay last winter, but wanted to sit, just as if it were summer weather. I broke up as many as a dozen broody hens last January. In the face of facts like these I naturally give the credit to alfalfa. This was the sole addition to their feed, and the only grain they had was corn and an occasional feed of boiled oats, for we did not sow wheat last year.

At the present writing I have over 600 thrifty growing chicks scratching in alfalfa litter for their grain. I have become an enthusiast on the subject of alfalfa, and I say to all breeders of chickens, sow it in the pens and also store it as a winter egg producer.

THE VALUE OF ALFALFA MEAL FOR EGG PRODUCTION.

By R. C. CALDWELL, in *American Poultry Journal.*

Alfalfa meal is an ideal winter green food and will supply during cold, stormy weather one great essential to large egg production. The fragrance of new-mown fields can be had on any cold winter day by adding boiling water to a half a pail of alfalfa meal. The hot water will bring out all the bright green color and the freshness of the original plant. The appetizing odor will make you yourself wish you might eat it. Place some before your hens daily and see their combs grow redder each day. Biddy will return her thanks to you in large, rich eggs that will have a flavor no case eggs can ever have. Those who keep fowls in close confinement the year around will find alfalfa as effective for summer as for winter feeding. No matter what your green food problem may be, alfalfa will solve it cheaper and better than anything else. Alfalfa-fed breeding stock will produce eggs for hatching of high fertility even very early in the season. Alfalfa meal furnishes elements needed for the production of the highest grade of eggs for table use or for hatching.

The manner of feeding meal is simple. It can be made one of the ingredients of your wet and dry mashes with perfect success. Feeding separately in hoppers is a very good way. This allows the birds to eat what they want when they wish it. For young stock mixing in

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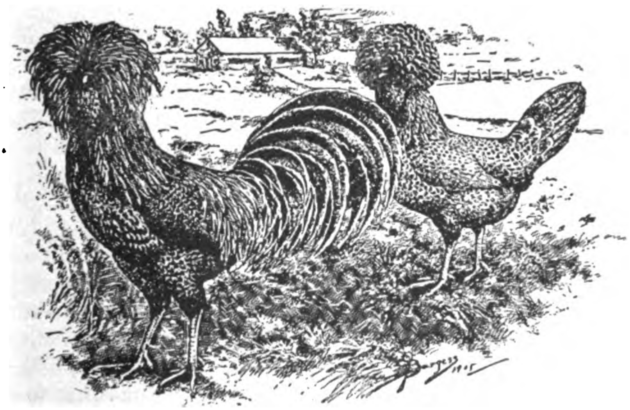
hoppers is good. Adding boiling water to the meal alone produces a rich, green food second only to growing grass. This can be fed in the same manner as your wet mash. You do not have to pay a big price for some secret formula to feed alfalfa meal. Take the formula you are now using, add some alfalfa meal, and it will be much better than before. No matter what feeding method you use, alfalfa meal will improve it.

Alfalfa meal will not only make your hens lay large numbers of first-class eggs, but it will assist in keeping them free from disease, as they receive elements from it that keep them well. The fresh, green alfalfa will furnish to fowls kept in confinement medicinal qualities which they when on free range instinctively find for themselves in various growing plants. It is better than medicine, costs less and is much less trouble. Alfalfa meal will keep your breeding birds in that perfect health and vigor so essential to the production of fertile eggs that will hatch large numbers of chicks that have the vitality which makes it easy for you to raise them to maturity. Even after the chicks are hatched they will grow faster and better if you keep alfalfa meal before them. Alfalfa is not a cure-all, but it is a very good feed for your chickens, young or old.

Most successful poultrymen, and a majority of the widely advertised systems of feeding, include alfalfa meal as one of the essential ingredients of their feeding formulas. Every successful feeder who has ever tried alfalfa meal is enthusiastic about it. This is sure evidence of the high regard they have for this high-grade feed.

So, in summing up, we find that alfalfa meal is the cheapest, most convenient and most effective form in which to buy winter green food; that its use will keep birds in unusually good health, which aids them to lay large numbers of high-grade eggs, especially during the winter months, and that the majority of successful poultry feeders use it. For these reasons alfalfa meal is recognized as the green food *par excellence* for all classes of poultry at all times of the year.



A pair of Buff Laced Polish.

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PRODUCING EARLY WINTER LAYERS.

By Prof. H. A. Bittenbender, in *Oklahoma Farmer*.

The poultry industry in Oklahoma does not measure up to the standard that it should. The reason for this is due largely to the fact that the farmer does not give the poultry the attention that he should, either in the management of the flock or in the housing. A large number of farm poultry flocks are forced to live in almost any kind of structure that has a roof over it. We often find the poultry stuck away in one corner of the building, where no sunlight ever reaches, and if there is any ventilation, it is ventilation of the wrong kind. If there is anything that tends to tear down the poultry industry, or hinder the profit, it is the kind of housing that a chicken receives. There is a good profit in poultry raising, but this profit can not be obtained unless the poultry is given some care and attention. In some instances we find that the chickens buy all the groceries, most of the clothes throughout the year, and at thrashing time the housewife has enough checks from the country store to pay the thrashing bill. We can expect a great deal from the chickens if we will only give them a chance; and to give them a chance we do not have to lay aside any of the other farm projects. We merely have to devote a little of our time each day towards the hen.

The phase of the poultry industry most profitable to Oklahoma is the winter egg production. The egg production in the Northern states during the winter time is held up because of the excessive cold weather, but Oklahoma is far enough south that the cold winter does not materially hinder the egg production. The Northern states are able to produce only about half as much as they consume. The eastern markets look toward the Southern states for the production of winter eggs. The cold storage places a large number of eggs on the market, but there is a great and excessive demand for fresh winter eggs. Last year Oklahoma, which is called the banner state for winter egg production, did not produce enough eggs for her own consumption. She had to ship from the Middle West cold-storage eggs to supply the local demand. Missouri, with practically the same climate as Oklahoma, produces many, many times the number of eggs that Oklahoma is producing. The reason for this is simply that farmers of Missouri see the profit in winter egg production. They have turned their attention toward this profitable phase of agriculture.

In order to produce a winter layer the first thing necessary, of course, is to get the right kind of stock. For farm conditions and for winter egg production it is hard to beat the following breeds: Plymouth Rocks, Rhode Island Reds, Orpingtons, Wyandottes, Langshans. For average farm conditions the lighter birds are too nervous, easily excited, wiry, and have too nervous a disposition to be very profitable on the farm. The large number of insects, worms, green food and the like that is available during the summer months make it possible to produce on the farm large, growthy roasters very cheaply, while the lighter birds are too small, even when mature, to make very good roasters. There is not very much profit in producing two- to three-pound poorly fleshed chickens. The trouble with the heavier birds, like Cochins and Brahmas, is that they are so slow maturing that they do not mature early enough to make good winter layers. One wants to secure a chicken that will mature fairly early and is both a good layer and a well-fleshed fowl. For this reason we consider it best to raise one of the middle-weight birds.

The best winter layers are obtained when the chicks are hatched during the month of March or the first part of April and are pushed right along on growing feeds until mature. On good range, with proper feeding, the middle-weight breed will begin laying in five to six months. A good way to make good winter layers is to keep them growing fast and vigorously, and give them plenty of range, with full liberty, giving them an opportunity to obtain lots of feed. We find that the chickens that have an opportunity to range around an orchard where there is plenty of shade will obtain a large amount of insects and green food and almost earn their living; but if we want especially good winter layers it is well to give them a little food besides. If a little Kafir corn is scattered out for them as a grain, with a little ground Kafir or mill-run mixed up in the form of a dry mash, so the chickens coming in at night or during the daytime can eat this ration, we will find that the Kafir and dry mash, with the green food and insects, will make a well-balanced ration. The chicks will grow fast, and in four to six months the pullets will start to lay.

About the time the sex can be determined, better results will be obtained if the cockerels are separated from the pullets, and the pullets pushed a little faster than the cockerels. One may often dispose of the male birds as broilers to good advantage, or they may be caponized and allowed to mature. They should not be allowed to run with the pullets after they are about twelve weeks old.

We find that in Oklahoma the mites, lice, stick-tight flea and diseases take a large number of our chickens each year, and in order to cut down as much of the loss as possible, strict sanitary precautions must be carried out. Everything about the coop must be absolutely clean. All feed must be only of the best kind; particularly must the water be kept fresh, clean and present in large quantities. If sufficient potassium permanganate is kept in the drinking water to make it a deep wine or purple red, we find that a large amount of trouble from diseases will be overcome. Limber-neck, one of the diseases in the late summer and fall, is caused by eating decayed animal matter. Decomposing animal material, especially dead chicks, must be thoroughly cleaned up, so that the other chicks will not eat any of the decayed flesh.

In order to rid the chicks of lice and mites we find that the coops must be thoroughly cleaned out often and sprayed occasionally with a strong disinfecting solution. Any of the coal-tar dips are effective. For powdering the chicks, a powder may be made in the following way: To a mixture of three parts gasoline and one part crude carbolic acid, stir in all the plaster of paris it will moisten. The powder will have a pronounced odor of carbolic acid, and have a brownish color. If one does not have the carbolic acid, sheep dip or commercial Creso may be used instead. A good preventive that can be used is two parts of lime to one of common salt, mixed together dry and allowed to stand about twelve hours, and then scattered around just before the chickens go to roost, on the dropping board, underneath the roost, and around all over. If this lime-and-salt mixture is placed in a dust bath we find it will often help eradicate the lice. Lime and salt is a good preventive, but will not kill them. It takes a strong disinfecting dip that will certainly kill the lice and mites. The stick-tight flea is rather hard to eradicate, but if sanitary measures are carried out, and plenty of lime and salt scattered around the roosting quarters and in the dust bath, we find that most of the fleas will be driven away. An application of carbolized vaseline to the face and wattles will help to exterminate the pests. Carbolized vaseline may be had by adding a tablespoon of pure carbolic acid to a 10-cent bottle of vaseline.

The matter of the loss of one chick does not mean very much in itself, but when we think that the cause of the loss of that chick may be passed on to the others, then it is quite serious. It is far better to use a large number of precautions and to give the chicks a little care than it is to trust to luck that you will pull them through. Young stock that has been allowed to pull through the summer if they can do not make the best winter layers. Chickens that are pushed during the growing age right on to maturity make the best winter producers. In order to obtain a good winter egg production it is necessary to have a warm house; the main thing necessary is to make conditions in the winter time as near like the summer as possible, regarding feed. It is not the warm weather of the spring mainly that causes the chick to lay, but it is the fact that she gets a large variety of feeds, plenty of green food, plenty of animal food, and a large amount of grinding and shell-forming material.

HOW TO PRODUCE WINTER EGGS.

By GEO. W. HACKETT, in *The Wisconsin Agriculturist.*

The hen and her product are important items on our daily bill of fare, and the man or woman who has succeeded in creating a large output of such product at a reasonable profit is entitled to a front seat among the successful producers of the world's food products. The farmer has ever been familiar with the song and cackle of the hen, yet he has little dreamed of her great possibilities. It has been left to those coming from success in other fields to exploit those possibilities and to demonstrate to her original owner that she is worthy of his thoughful consideration. I refer to such men as the Cornings, who are making utility poultry keeping an exceedingly profitable venture, realizing a profit of over six dollars per year on each hen kept. These men have come to us with radically different ideas and methods than we have been accustomed to, but their success has been a revelation to all well-informed poultrymen, and demonstrates what can be done by applying systematic business methods to the industry.

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Fresh eggs have been such an expensive item for the past few months that I do not wonder that "winter eggs" is becoming the most important of all poultry subjects. The poultry business has become a recognized industry, and the greatest factor in the business is that of producing eggs. It is estimated that about four-fifths of the poultry products of the United States come from the general farms, but it is safe to say that only a small per cent of it is produced at a reasonable profit, but due to no fault of the hen. The high prices paid for winter eggs will avail nothing to the farmer who has no eggs to sell. If you want to do a winter dairying business you do not wait until winter sets in to make your preparations; you have been at it for a year at least, and perhaps for several years. To secure the best results for your feed and labor, you have been selecting, breeding and testing, to secure the highest possible efficiency, and without this preparation you could hardly expect to get satisfactory returns from your dairy. Strange, is it not, that many a farmer who exercises the greatest care in breeding up his dairy herd or other kinds of live stock thinks he should get good results from any old kind of a hen? If you don't like chickens, keep but few of them, but give those you do keep a chance to make good. If you do like them, give them the same careful attention you do your dairy herd, and they will respond most liberally to such care.

The pullets intended for winter layers should reach full development before cold weather sets in. In the large breeds the pullets should be about six to seven months of age, and in the lighter breeds about a month younger. It is not desirable to force development too rapidly in pullets intended for layers. Pullets are usually more prolific layers than hens, but it will be found profitable to keep the hens through their second laying season, and where by the use of the trap nest we find an extra good layer we keep her considerably longer. Hens should be well cared for and sheltered from storms and cold winds during their molting period, and be on the job with a well-finished coat by the first of November. It is best to pen the pullets and hens separately, as the pullets will require a little heavier feed than the hens for a time. Separate the males from all of them, as you will get more and better eggs without their presence.

An important part of winter egg production is the house in which the layers are kept. It matters but little whether you use the permanent house or the colony house, the fresh-air system will be found to be the best for health. See to it that your fowls are free from vermin and that the houses are in a clean and sanitary condition. Give each fowl about four square feet of floor space, which you should keep well covered with clean, coarse straw or other suitable litter. Feed all grain in this litter to insure plenty of exercise, and never let the fowls out in the cold or on the snow.

A good scratch feed may be prepared by mixing together 100 pounds of corn (cracked preferred), 100 pounds of wheat, 50 pounds heavy oats and 50 pounds of buckwheat. This should always be fed in the litter and well covered with it. This is fed in connection with a mash, which is prepared as follows: 100 pounds of corn meal, 100 pounds of middlings, 50 pounds of wheat bran, 50 pounds of ground oats, 50 pounds of beef scrap, 25 pounds of oil meal, 25 pounds of alfalfa meal. Feed this dry in hoppers to which the hens have constant access. An occasional armful of alfalfa or well-cured clover hay thrown in the pens will be appreciated by the hens. Fresh vegetables should be given at least three times a week, and a less amount given each day would probably be better. Sprouted oats are also a very excellent feed for all kinds of poultry, and especially fine for laying hens.

It is essential that the hens have all the fresh, clean water they want and that the water vessels are kept well cleaned out. Do not forget to supply sharp grit and oyster shells, and by so doing avoid many of the ills so common to poultry confined to winter quarters.

On the great egg farms of the country, where poultry keeping is a business, the routine of feeding, watering, gathering eggs, etc., is done with great precision and by the tick of the clock. The nearer we can follow this plan on the farm the better will be our results. If these suggestions are faithfully followed, and you do not get a good supply of "winter eggs," the fault is with your hens, and the sooner you replace them with fowls that have been bred to lay the better it will be for you.

There is no excuse for keeping hens on the farm that will average less than from ten to fifteen dozen eggs a year. I believe the time is coming when the farmer will practice special mating and the use of the trap nest. It is the only reliable method whereby a substantial increase of egg production can be obtained in a strain of fowls.

There is another phase of the egg business of which I wish to speak briefly. It relates more especially to eggs produced in warm weather, but is not without bearing on my subject. With all our preaching about winter eggs, by far the greater supply will be produced in the summer season, and the value of the product will always depend largely upon the condition in which it reaches the consumer. Recent investigations carried on by the Bureau of Animal Industry at Washington and by some of the state agricultural colleges have revealed surprising conditions relative to the manner and condition in which so important a product is put upon the retail market of our great cities. The investigation involved the practices employed on nearly one hundred farms, to which representatives were sent to observe conditions and follow the eggs in their natural course from the farm to the consumer.

It was found that in many cases the eggs were gathered very irregularly, sometimes only twice a week and sometimes not that often. After being gathered they were kept in warm rooms until convenient for the farmer to carry them to town, where they were exchanged for groceries.

The grocer in turn kept them until his stock had accumulated sufficiently for a shipment, which sometimes required several days. They were often kept in rooms or storehouses where the taint from oil or from decayed fruit and vegetables did not add to their flavor. After reaching the retailer in the city several days later, is it any wonder that the market price of eggs is too low to be profitable in the summer time? I can not go into detail regarding the many interesting facts brought out by these investigations, but suffice to say that the present methods of marketing eggs throughout the country is about on a par with the methods used in marketing butter before the day of the cream separator and the creamery.

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The egg is a highly nutritious food product, easy to care for and conveniently packed for market, yet we are informed by these investigators that about 17 per cent of the total value of the product is lost to the farmer on account of the careless and inefficient manner in which it is handled.

There are few lines of business that could withstand such a waste. The loss alone would amount to a sufficient profit to satisfy some of our less avaricious corporations. In order to overcome the flaws in the present system of getting farmers' eggs to market, it is necessary to adopt a system which will shorten the period between the laying of the egg and the time of reaching the consumers' table. Hand in hand with the shortening of this period, there would naturally be fewer hands through which the eggs must pass, and to each of which they must pay a profit. A coöperative system of marketing would bring these results. In Denmark, we are told, this system has been largely responsible for the great impetus given the poultry industry there, and has made Danish eggs a standard on the English market.

Here in the United States a number of coöperative creameries have taken up the handling of eggs with splendid success. The American Poultry Association, through its various branches, is working out systems whereby similar methods will be employed to secure the desired ends. They will endeavor to interest farmers and poultrymen living in close proximity to club together to market their eggs. This will enable them to ship every two or three days, while if each was to market his eggs individually he could not wait, with the average-size flock, until he had a case of eggs to ship. One of these men would have to act as receiver of the eggs and to see to their shipment. By shipping by express it would be possible to put the eggs in the hands of a first-class retailer, many of whom are anxious to secure eggs of dependable quality at an advanced price over the regular market.

It can be readily seen that the success of the scheme will depend upon building up a reputation for strictly fresh eggs, and in order to protect the farmers from the carelessness of any individual, certain precautions are necessary. These eggs are destined for first-class trade, and should be put up in cartons, each holding one dozen; each egg and the filled carton should be stamped as packed with a small stamp bearing a number which has been assigned to that particular farmer. Thus the eggs are identified and the farmer becomes directly responsible for their quality. It would be well for such clubs to adopt a set of rules, mutually agreeing to do certain things relative to gathering, packing and delivering the eggs to the shipper. This would mean better prices to the producer and much improved quality to the consumer, and would also effect a much larger consumption.

It would also mean a greatly increased interest in the poultry kept upon the farm, especially in standard-bred poultry, and no other kind should be kept. Mix common sense with all your poultry work. Give careful attention to the details, of which there are many; develop the best possible methods of putting the product in the hands of the consumer, and you will be amply repaid for the extra work involved in securing "winter eggs."

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F. W. Kazmeier, writing in *American Poultry Journal* about this, says:

A hen that lays when the eggs are dearest is the hen that pays, and also is the hen that is dearest to the poultryman. To meet with any degree of success we must consider four important factors, as follows:

1. Good stock, early hatched, well fed and cared for every day in the year.
2. Different kinds of feed, rightly fed.
3. Proper housing.
4. Exercise.

By good stock we mean pure-bred and stock hatched from eggs produced by stock which by actual records have proven themselves as good winter layers. They should, of course, be constitutionally strong, so they can stand the heavy feeding winter egg producers usually get. In my opinion early hatched pullets make the best winter egg producers. Most of the American-class breeds should be hatched not later than the month of April; the Mediterranean-class breeds should not be hatched before April and not later than May. Too early hatched birds of the Mediterranean class are very apt to molt in the fall, and in that case are not much better for winter layers than hens.

Not only should they be good stock and early hatched, but they should also be well fed and housed throughout the entire season. They should be hatched by the best of incubators, brooded by the latest methods and kept under sanitary conditions. Keep them free of any kind of vermin. Raise them on free range under natural conditions as much as possible. Feed and care for them so that they will grow every day in the year.

Then practice selection. By that I mean that if you want 100 good layers, then raise at least 200, so you select the best, most mature and thrifty birds. Fatten and market the rest. It is safe to select the quickest-maturing birds, because they are in most cases the best layers and also the constitutionally strongest.

Feed a variety of grains, like wheat, oats, corn, peas, buckwheat and barley. Not only a variety of grains, but feed it in a variety of ways. In feeding for heavy egg production feed foods rich in protein, like beef scraps and green cut bone.

Do not overfeed your hens, but neither underfeed, as either is not conducive to producing eggs. In the morning feed only a slight feeding of grain in deep litter, but in the evening give a plentiful supply, so they can fill their crops and a little be left over which they can dig up in the early morning. Fowls, in order to do well, should have an empty crop in the morning and a full crop in the evening.

The writer has fed his winter layers as follows, with exceptionally good results:

In the morning, as early as possible, a slight feeding of grain mixture—one part corn, one part wheat and one-half part oats. At noon, a feeding of mangels and green cut bone. The green cut bone at the rate of one-half ounce per fowl. The green cut bone is scattered right on the litter; the mangels are hung on the walls so they can help themselves. Just feed enough mangels so that by evening they are all cleaned up. The last feeding at night scatter enough of the above grain mixture in the litter so that they will be able to fill up and leave a little over. The

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grain mixture is always fed in a deep and loose litter, and in the morning special pains are taken to get them buried well by the aid of a fork. In addition to the grain mixture a dry-mash mixture is always before them in hoppers so they can help themselves. This mash is made as follows: Three parts wheat bran, three parts corn meal, two parts wheat middlings, one part oil meal, two parts beef scraps. A separate dish of clean water, oyster shells and grit is always before them. In cold weather the chill is always taken off their drinking water.

In connection with the above, for a variety, some days they are given cut alfalfa and clover as well as cabbage leaves and heads.

Charcoal can be fed to good advantage to hens that are being forced for heavy egg production. It is a great purifier and corrective, having a remarkable power of absorbing acids and gases.

In housing winter layers there are four most important factors you must provide, no matter what style of house construction you have. They are:

1. Plenty of fresh air and sunshine.
2. Freedom from drafts and dampness.
3. Right temperature.
4. Correct amount of floor space.

The style of house construction which will meet the above requirements the nearest is the curtain-and-glass-front house. In this style they have plenty of fresh air and sunshine. To have it free from drafts, build the three sides as nearly air-tight as possible.

In order to have it dry, raise the foundation well above the surrounding ground, put in a good concrete floor, and aim to have the muslin curtains up every day except when a storm is coming from the open side in the winter.

By right temperature we mean to have it just about warm enough so that the attendant can comfortably do the work. In that case it will also be comfortable for the working hen and a comfortable hen is a laying hen.

About four feet square of floor space per fowl is sufficient. The writer is of the opinion that the most important factor, next to feed, in handling winter layers is exercise. This can best be provided by burying their grain feeds in a deep litter and by giving them a rather scarce feeding in the morning. Make them work for as much of their feed as possible.

Ralph H. Searle treats the same subject, in *Poultry Culture*, thus:

I know several people who have been "on the trail of the elusive winter egg" for lo these many years, and they seem no nearer the goal than when they started. They have about come to the conclusion that "hens were n't intended to lay in the winter anyway, and they just won't, no matter what you do to them." If you tell them that you have no trouble in producing winter eggs, you are rewarded with a look which says plainer than words, "You might make some one who is inexperienced believe that, but not me. *I know better.*"

Others seem to think that there is some dark secret about winter egg

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production, which, if they could only discover, their troubles would be over. Still others resort to medicines and strong condimental tonics, artificially forcing their hens to do what they would naturally do if properly cared for, with the result that they come out in the spring exhausted and incapable of producing eggs which will hatch strong, healthy chicks. Still others of a more or less scientific turn of mind delve into the mysteries of organic chemistry and figure with mathematical precision the various constituents of an egg and of the various grains and foods for which hens seem to have a special fondness. They give us the exact ratio between the protein and carbohydrates which is required in rations in order to produce a maximum amount of "hen fruit," all of which is Greek to the average person. This is not intended as a slur on the splendid work which is being done at our agricultural colleges in feeds and feeding. But the fact remains that to the person who has not had an opportunity to take one of these courses and become familiar with the technical terms employed, it is useless to talk what is ordinarily called "scientific feeding."

MERELY A MATTER OF COMMON SENSE.

As a matter of fact, there is no secret, no slight of hand nor hocus-pocus about the production of winter eggs. It is merely a matter of common sense, of carefully following a few simple rules which can be easily understood by any one. The sooner the great mass of poultry raisers, especially in the country, realize this fact and quit making mountains out of mole hills, the sooner will they begin to realize the profit out of the poultry business which is rightfully theirs.

Resolving the problem into its elements, we find that there are four prime essentials to the successful production of winter eggs—the man (and when we say man we embrace the ladies), the hen, the house, and the feed. Everything else is secondary. Let us briefly discuss these four essentials.

THE MAN.

There are some people who never will be successful in the production of winter eggs or anything else. To put it briefly and bluntly, they are too lazy. And we all know that that malady is at its height during the winter months. It is a matter of common knowledge that the bed, any bed, is more comfortable at seven A. M. than at any other time in the day. The winter days are short, and the successful poultryman must keep his hens busy from the moment they first drowsily leave the roosts. He must have the quality of stick-to-itiveness well developed. Above all things else, he must love his birds and make their needs his constant study. Good care to-day and neglect to-morrow will never make the biddies shell out their golden nuggets.

THE HEN.

I really should have mentioned the hen first, for without her we will never get very far in the business of winter egg production unless we own a cold-storage plant. Let no one deceive himself into thinking that any old hen will lay eggs in the winter time. In fact, she should not be old at all, as that term is generally used. Early hatched pullets and

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yearling hens are best suited for this purpose.

She must not be fat. The average farm hen is too fat to lay many winter eggs. She has free access to the corn cribs and hog lots, and goes into the winter as fat as the hogs she steals the corn from—often fatter. A hen which will lay in such a condition is the exception, not the rule.

She must be in perfect health. The hen which has become diseased or in any way out of condition will not lay during the cold weather, and had better be disposed of.

"Which is the best breed for winter egg production?" some one asks. The question is difficult to answer. You can find articles in the poultry papers making strong claims along this line for nearly every breed found in the Standard—claims made by conscientious breeders who really believe what they are saying. The fact is that less depends upon the breed than is usually thought to be the case. Good laying strains can be found in every breed, developed by years of careful mating and selection for that particular function. It may be safely laid down as a general rule, however, that the Mediterranean breeds, Leghorns, Minorcas, Anconas, etc., will naturally produce the largest number of winter eggs if given the proper care.

Whether or not they are the best breeds for the farmer it is not within the scope of this article to discuss.

THE HOUSE.

The building in which the hens are housed is a very important factor in solving the problem of winter egg production. The time is still well within our memory when it was the prevailing opinion that the houses should be made as warm and tight as possible, double sided, with dead-air space between—glass front, etc. And even then we were advised to supply some sort of artificial heat. These houses were necessarily expensive, and the results obtained were discouraging in almost every case. They were hot in the daytime and cold at night. They were damp, the fowls took cold easily, and there was no end to the trouble which ensued.

To make a long story short, careful students of poultry culture soon discovered that they had been working on a false theory. They found that the hen is endowed by nature with a heavier coat of feathers in winter, just as the hair on a horse becomes longer and thicker as the cold weather approaches. In other words, hothouses were not only unnecessary but a positive detriment to her.

The house which is now in use on the largest and most successful egg farms in the country is what is known as the "curtain-front" or "fresh-air" house. These houses are inexpensive, being constructed of cheap sheathing, covered on the roof, ends and north side with two-ply roofing or heavy tar paper. The south side is left almost entirely open from about two feet above the ground to the roof, wire netting, of course, being nailed over the opening. Muslin curtains on hinged frames are fastened at the top of the openings. In the daytime, except in stormy weather, these curtains are swung back up against the roof, thus admitting an abundance of sunshine. A second set of curtains is fastened in the same manner, so that they can be let down just in front of the roosts on very cold nights.

This style of house is successfully used even in the coldest parts of the country. Hens kept in them remain healthy and vigorous, and when properly fed and cared for shell out the eggs in an amazing manner. If you have an old-fashioned tight henhouse, or one with only a small glass window or two on the south side, the sooner you remodel it into a fresh-air house the better results you will secure during the winter.

THE FEED.

We come now to that part of our subject regarding which there are a multitude of opinions. While we have too much respect for the opinions of others to assert that our method is the best, yet it has given us the best results of several which we have tried. It is simplicity itself, and has enabled us to produce a large number of winter eggs, at a neat profit, from a breed not famous for its winter egg-laying qualities.

The hens are placed in an open-front house some time in November, whenever the weather begins to grow cold and stormy, and kept there until the balmy days of spring come on. "Don't you let them out on nice days?" I hear some one say. No ma'am, we do not. Turn the hens loose after they have been shut up a few days and the egg production immediately drops off. When you shut them up again they are discontented and restless and it is several days before they get down to business again.

But to return to the feed. Just as soon as the hens drop from the roosts in the morning they are given wheat, about a quart to fifteen hens, in a thick litter of straw, about a foot deep. The wheat is thoroughly worked into the straw with a fork, and it takes most of the forenoon to work it out. And right here is one of the "deep secrets" of winter egg production: *Keep them busy!* At noon the operation is repeated. About 4:30 in the afternoon they are ready for supper, and we fill them up with—yes, you have guessed it—sprouted oats, with a dessert of shelled corn if the weather is severe, sending them to roost full and satisfied for the first time in twenty-four hours.

Simple, isn't it? And it works; will pay you a nice profit even if you have to pay $1.15 per bushel for the wheat, as we had to last winter. Grit, oyster shell and charcoal are kept before them in hoppers at all times; also plenty of pure water.

Three times a week they are given a feed of green cut bone. An ounce per hen is sufficient, and should be given so that each hen will get her share. An oats sprouter and a green-bone cutter are two appliances which will pay a splendid interest on the investment, and which no person who keeps fifty hens or more can afford to be without.

In closing I just want to reiterate what I said in the beginning: Winter egg production is merely a matter of common sense—applied by the man to the hen, the house and the feed.

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BREEDING FOR WINTER EGGS.

From *Farmer and Breeder.*

Any breed of fowls properly cared for and comfortably housed will lay eggs; but if you are to get eggs in winter when the price is high there are several things you must do. Generally speaking, breed is not now counted as much of a factor in the production of eggs, but we can not get around the fact that some breeds lay better than others under certain conditions. Some breeds respond to confinement better than others and some require less food for given results. One of the things for the poultryman to learn, then, is how to care for his particular breed in order to get the best results in winter egg production. If you are so situated that it is an impossibility to hatch your pullet crop in March or early April, then you had better keep a small breed, such as the Leghorn, Spanish or Hamburg. The smaller breeds, if hatched during the last week in April, should be ready to lay as early as the larger breeds which came off in March. These smaller breeds are ideal where unlimited range is to be had; they will often range more than half a mile from home, while the larger breeds keep closer about the premises. Larger breeds do better in confinement and in colony groups; they are much easier kept in bounds and do not fret over confinement. However, the larger breeds need a lot of encouragement to keep them busy and prevent them from laying on too much fat. The poultryman, having settled the question of class, may choose almost any breed in that class which suits his fancy. There will be no great difference in results, provided he chooses his birds from an egg-laying strain. This latter element is, after all, the one of greatest moment. There are laying strains among hens the same as there are milk strains among cows and draft strains among horses.

In these days of trap nests and careful breeding it is not difficult to get birds that will produce pretty close to what a dependable breeder claims for his stock. Another thing, it is claimed that any strain that has been bred to lay in winter will lay more eggs during that season than during any other. We have always inclined to think that it is more a matter of getting the pullets started at the right time and keeping them in trim, claiming that if the eggs are there they can be produced in winter as well as at any other time, provided the birds get the right kind of care. Cattle raisers will tell you that if a heifer calf is to be developed into a great milker it must be cared for with that idea in view from the day of its birth; the same is true of pullets intended for winter egg production. Vigor is just as important in the growing stock intended for winter layers as it is in those to be kept for breeding purposes. Indeed, it takes a vigorous hen to stand the strain of egg production all winter and come out able for another season of the same kind of work. Most of us are obliged to keep all good layers the second season in order to keep up the size of our flocks; but if a poultryman can get all the pul-

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lets he needs hatched early in the spring, he should keep only pullets for laying, as it is generally conceded that a pullet lays more eggs and at a lower cost for feed consumed during her first laying year than at any other time in her existence.

The second-season hens make the best breeders from which to hatch the season's crop of pullets. It has been proved by extensive experiments that older hens produce better and stronger chicks than hens under eighteen months of age. Then there is the added advantage in that one may know something of the individual performance of each hen, and therefore be able to pick one's breeding stock from the very best in the flock. If you have a dozen hens which have proved especially heavy layers during the preceding winter, it will pay you to keep them by themselves the second season and give them the best of care, but don't force them for heavy egg production. Let them lay if they will, but do not hasten matters. About the first of the year mate them to the best cockerel from an egg strain you can afford to buy, and save every egg they lay for hatching your spring supply of pullets. Save the cockerels for sale as special breeders. In this way you can soon work up an egg-laying strain of your own.

In building up an egg-laying strain never use a hen that has ever suffered from a constitutional disease, such as roup, tuberculosis or rheumatism. These diseases, no matter how complete the cure may appear to be, are pretty apt to leave a weakened constitution which they may transmit to the offspring. You can not afford to perpetuate a family weakness in your new strain. Unless you have had long years of experience do not attempt to inbreed; neither practice line breeding. Unless handled very wisely, these practices tend to encourage family weaknesses. The 200-egg hen is a possibility even in the farmer's flock in the near future.

It is customary for those contemplating chicken farming to base their calculations upon the assumption that a hen lays an egg a day, and that the annual product of a hen is, therefore, 365 eggs. There are some optimistic amateurs who believe that hens sometimes, under favorable conditions, lay two eggs a day. This, of course. would be very profitable to the chicken farmer. But facts do not accord with the theories of the enthusiast. A recent bulletin by the New York State College of Agriculture at Cornell University, in which a year's results in egg production by champion layers is given, shows as follows: Best pullet laid 257 eggs; next pullet laid 245 eggs; 15 highest producing pullets averaged 236 eggs each; best single flock pullets averaged 182 eggs each. These records are undoubtedly a great deal higher than the ordinary chicken farmer could reasonably look for. If fifteen of the highest producing pullets, under the scientific management of the experts at the State College of Agriculture, could not be induced to lay more than 236 eggs each in a year, it is scarcely probable that the flock of the average chicken farmer would come near those figures.

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EGGS AND WINTER CARE.

By C. L. Parkhurst, in *The Poultry Tribune.*

With eggs at fifty and sixty cents per dozen, we think of the best care we can possibly give to get what eggs we can while they are so high. We must provide a good variety of foods. The rations must consist of foods which furnish the nutrients at the lowest possible cost. It is not how much a fowl eats, but how much it can digest, that determines the value of a food. Various classes of animals differ in their power to digest the same kind of food. Foods also vary in their digestibility. When used by the same animal a certain proportion of their ration should be of whole grains, in order to provide muscular activity of the digestive organs; this is made necessary in grinding the grain. Also a certain proportion should be of ground grains, soft foods; this is for the purpose of providing quickly available nutrients to supply the immediate demands of rapid growth or heavy, continuous egg yield. We must give biddy a good warm, dry, comfortable place. She can stand a lot of cold if she has a warm place to sleep and does n't have a draft of wind blowing on her. Open-front houses are the ideal houses if you have them arranged right—have the roosts back quite a few feet from the opening and have curtains in front of the roosts; the house will be dryer. A damp house will cause colds in winter every time. Keep the hens busy these cold days, and, before all, love your hens and they will love you, and they will give you good returns for all the good care you give. Provide dust boxes in every department, near a window, where they can get lots of sun and light. They do enjoy wallowing in the dust or sifted ashes, and it is good for them, as it gives a little exercise, which is surely beneficial in winter. Getting eggs in winter, most people say, is against nature; but the poultryman that makes poultry keep him and pay for their own food, build their houses and thousands of other things, know poultry will pay in winter, and will also lay in winter if they are fed egg-making foods and given a good chance. Now I will give you an outline of the method I use in feeding Leghorn and Orpington hens; I succeed well with it in the winter months. Others may have much better results with some other method. I have tried other methods, but found this one the most satisfactory for cold weather. Feed differently in warm weather. The first thing in the morning I go to all my houses, which are several in number, and scatter a little buckwheat in their litter, which I keep six or eight inches deep on the floor, and clean and dry, for them to dig in. I just scatter a little—probably about half what they would eat; they should be hungry, and will go to digging and singing till you can not hear yourself think. This gives them the desired exercise, warms them up, and does them lots of good. I try to feed this about the time they get up, which is about daylight; then I give them all water. This is a very essential thing, as so much of the egg is water; they must have all the water they want—not ice water. Ice water is very bad for them. They will not drink ice water if they can get other, but, of course, if they are obliged to or go without they will drink a small amount, and that means a shortage in eggs, because the water is so cold and icy they do not drink the required amount, and so, of course, the eggs drop off. Then, after doing this, at about 10 o'clock I feed a ground mash, composed of 100 pounds of bran, the best I can buy—spring-wheat bran I find the best—100 pounds corn meal, 200 pounds gluten meal, 25 pounds ground alfalfa, 10 pounds charcoal. This mash I mix thoroughly. When I feed mash I mix it with warm water, or, better still, if I have it, sour milk. Salt your mash as though you intended to eat it yourself. Hens need salt, but feed it only as in a mash, wet up a little. A little pepper once or twice a week is also good for them. Now, when feeding mash do not feed a great lot of it, for remember they have had some food in their litter, and we want them to eat of other things we have for them. Having fed mash to all houses, I then take sour milk around to all the houses; that is, good sour milk, the thicker the better; they dearly love it. The sourness and the acid in it aids in digestion, and is one of the greatest of egg foods. Farmers do not realize the value in milk. The whey out of the sour milk is excellent in mixing the mash. I also at this time give vegetables, such as sprouted oats, cabbage, beets, rutabagas; potatoes are good either raw or boiled. Then at about 12:30 I feed one kind of whole grain in the litter for exercise, either wheat, buckwheat, Kafir corn, millet, barley—any of these—and sometimes mix all together. Then every other day I feed ground meat and bone in the middle of the afternoon. I keep hoppers in all my houses. They are divided into different parts—one for grit, one for oyster shells, one for charcoal, one part to keep bran in, one for the wet mash that I spoke of, and I keep whole oats on one side. I think whole oats are a very good feed. A hen sometimes does not take to them, but I keep them in the hopper in this way, and I find they eat them, while others go for the dry bran and some for the mixed mash. They balance up their rations out of the hoppers—just what their systems call for. Then at night their last feed in cold weather is usually whole corn, scattered in litter, or, if you have it on the cob, break the cob into small pieces and give it to them and let them pick it off. This gives them lots of exercise also. Where one feeds it this way it should be fed earlier, because it takes so long to pick it off. Do not give them too much of any kind of food. I feed sparingly of all kinds, because I want them to have the different kinds. If when you go in biddy does not meet you at the door you may know she is not very hungry; better keep her a bit hungry than feed too much. If you throw a great lot of whole corn in at a feed it lies there, more than she can eat at once, and next time she eats it is the same thing, and she gets so she does not want anything. Some may think there is a lot of work feeding hens in this way. Surely a man who works away from home from seven until six could not follow this method, but I keep a lot of hens and have to be at my post all the time, and I get better results for winter eggs with this method than with others I have tried. I am sure if one makes a success in the poultry business he has something to do; at least I do. We will soon have, or ought to have, some chicks. Those who intend to get out some real early pullets for winter and fall

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layers should be at it now, also some for the fall and winter shows. There are a lot who will want cockerels and pullets for the early fall shows. Get at it and get some chicks agoing. There are lots who will sell you baby chicks or eggs. Better get a few of one or the other and brighten up your flock a bit. Change the blood a little. Buy a setting of eggs. You are likely to get prize winners worth a good deal or a nice cockerel to head a pen another year. Do not put it off until the day you want the chicks before you think of getting them, or even writing to the ones you have in view of sending to for some eggs or chicks, and then be disappointed because he has so many orders ahead of yours that you can not possibly get them under five or six weeks of the desired time. Perhaps if you write to two or three different ones you would find they all have all the orders they can handle for some time, where if you would write and engage them before the time you want them it would save you a lot of trouble and you could get them as early as you like.

REMARKABLE RECORD OF A LEGHORN HEN.

From *American Agriculturist.*

The poultry department of the New York State College of Agriculture at Ithaca has been doing particularly interesting work in breeding for egg production. Among its flock are 12 pullets which averaged 182 eggs each during their first laying year, and 15 others which made an average of 236 eggs. In the latter group are two fowls which deserve special attention. Madame Cornell in her first year produced 245 eggs, which weighed 30.6 pounds, and Lady Cornell 257 eggs, which weighed 29½ pounds. This article has to do principally with Lady Cornell.

Lady Cornell is a Single Comb White Leghorn that weighs 3.2 pounds and that laid 257 eggs averaging 1.8 ounces each, or 9.2 pounds of eggs for each pound of her live weight. From a purely physiological standpoint this performance is remarkable. No other official record has been published by any of the experiment stations to equal it. In her second year she laid 200 eggs, weighing 23.69 pounds. A still more remarkable achievement lies in the fact that in two consecutive years she laid 457 eggs, which weighed 53.19 pounds.

HEN BEATS DAIRY COW AS PRODUCER.

These achievements prove the truth of the statements which Dr. W. H. Jordan, director of the New York State Experiment Station at Geneva, made when comparing a Leghorn fowl of 3½ pounds with a Jersey cow that weighs 1000 pounds, the hen having laid in a year 200 eggs and the cow having produced 7000 pounds of milk, containing 14 per cent of solids. Doctor Jordan says: "If you take the dry matter of the hen and compare it with the dry matter in the eggs she lays in a year, there will be 5½ times as much dry matter in the eggs as in her whole body. The weight of the dry matter in the cow's body to the weight of the dry matter in the milk will be as 1 to 2.9. In other words, based upon the dry matter, the hen does twice as well as the cow. I suspect the hen is the most efficient transformer of raw material into a finished product that

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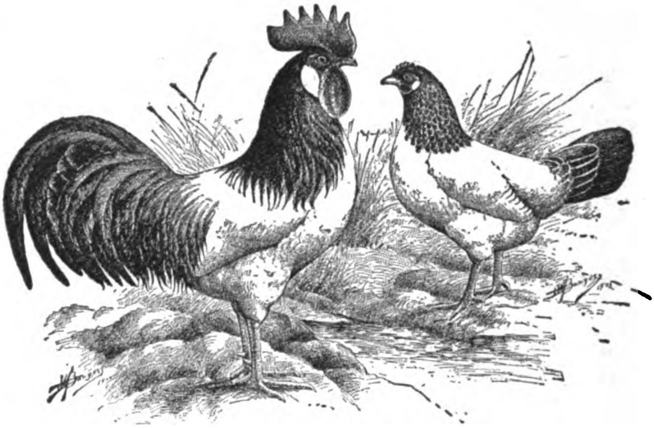
there is on the farm. Her physiological activity is something remarkable. So in that particular the hen stands in a class by herself." In terms of dry matter, it has been estimated that Lady Cornell weighed 1.4 pounds, that she consumed in one year 88.1 pounds, and produced eggs containing 10.1 pounds, or 7.1 pounds for each pound of dry matter in her body. These estimations more than bear out what has been quoted from Doctor Jordan.



A pair of Lakenvelders.

A careful trap-nest record and other accounts were kept with the flock, of which this hen was one, and from these records have been estimated the food she ate, the eggs she laid, her voidings, the labor required to keep her, her earnings, etc. Her eggs were sold on the Ithaca market for $7.43. It was estimated that she ate 110 pounds of food, which cost $1.66, that the labor to keep her was 75 cents, interest on investment 25 cents, or a total of $2.66. The 73 pounds of manure were estimated to be worth 29 cents, so the total receipts from eggs and manure is $7.72. The net profit which she yielded for the year was $5.06. No allowance was made for depreciation in the value of the hen herself.

In actual commercial practice, whole flocks of good hens average about 132 eggs each a year, though some flocks reach 144. The hens in average farm flocks doubtless lay less than 100 eggs each a year. From these figures, the achievements of Lady Cornell and of Madame Cornell stand out boldly. Of course they are phenomenal, but when taken in connection with what the flocks of 12 and 15 pullets mentioned have done they emphasize the importance of, (1) keeping an egg-laying strain; (2) of careful selection; (3) of breeding for constitutional vigor; (4) a suitable ration; (5) fresh-air house conditions, and (6) care and skill in both feeding and management.

As to the ration, the following whole-grain mixture is fed morning and afternoon in a straw litter:

Grain rations for layers.

	By weight, pounds.	By measure, quarts.
Winter:		
Wheat	60	32
Corn	60	36
Oats	30	30
Buckwheat	30	20
Summer:		
Wheat	60	32
Corn	60	36
Oats	30	30

During the afternoon the following mash is fed dry in a hopper. In the mornings the hopper is kept closed:

Dry mash for all seasons.

	Weight, pounds.	Measure, quarts.
Cornmeal	60	57
Wheat middlings	60	71
Wheat bran	30	57
Alfalfa meal	10	20
Oil meal	10	8
Beef scrap	50	43
Salt	1	½

Fowls should eat about twice as much whole grain as mash. The proportion may be regulated between ground feed and grain by giving a light feeding of grain in the morning and about as much as the fowls will consume in the afternoon; that is, before dark. It was found advisable in the case of heavy-laying pullets and fowls to restrict both morning and evening feeding, so as to induce liberal consumption of a dry mash. This was especially true in the case of hens. It was also found advisable to supplement the above rations with green feed, such as sprouted oats, cabbage, green clover, beets and other succulent feeds, except where the fowls were running on a grass range. At all times grit, cracked oyster shells, granulated bone and charcoal were accessible to the fowls. Not only does the record which Lady Cornell made furnish interesting and even startling evidence of human achievement in handling the forces of nature, but it indicates what may be expected from careful breeding and management in the future. The gradual evolution of the domestic fowl from wild fowls, which lay only a couple of dozen eggs a year, when compared with the record of Lady Cornell, certainly points the way to still more important egg production. Lady Cornell may be considered as a forerunner of a great army of fowls which will be developed by man when the laws of breeding and feeding are more generally put in practice.

Her phenomenal performance, like that of all phenomenal animals, serves to point out the possible rather than the probable yield. Commercial poultrymen must reckon with high averages rather than with exceptional individuals, but the exceptional individual serves to indicate what may be done under best conditions.

THE AGE TO KILL THE HENS.

"It is a debatable question among poultrymen how long it is profitable to keep a layer. For a long time it has been advised to discard the laying stock at the end of the first year and replace it with pullets hatched each spring. This, no doubt, is good advice to those keeping the heavier breeds, but how about the lighter breeds?

"My experience with Leghorns has taught me that a pullet was apt to produce more eggs than a yearling or a two-lear-old hen, but not enough more to pay for the difference in the cost and trouble of raising her. A hen lays a larger egg than a pullet, and her eggs make a better appearance in market.

"It costs much to replenish one's flock each year, to say nothing about the extra room, time and pains required. Some poultry keepers, with a flock of 400 fowls will raise 100 pullets each year, and thus their flock is renewed every four years. Such a system is found to work very satisfactorily and is a great saving.

"Careful selection of the best layers regardless of their age, except that a certain age limit is fixed, will give one a flock productive of the best results.

"Among some varieties of fowls it may not be wise to keep the laying stock more than one year, for some breeds take on fat rapidly after reaching full maturity, and are almost useless as egg producers. But among the lighter and more active breeds, such as Leghorns, Hamburgs, Polish and Minorcas, there is no necessity of disposing of the layers at the end of their first year. They may be kept for two to four years.

"I have known my father to keep White Leghorns for eight years that were profitable up to the time of their disposal. He had a system of his own that he followed. Every fall he would look over his flock and select those that were unusually fat or those whose combs were small and withered and seemed less promising as layers than the others. These were killed and marketed at intervals of two weeks.

"This elimination of nonlayers and overfat stock went on from November to the middle of February each year, and enough pullets were raised to take the place of those that had been marketed. His flock was always profitable and none of the neighbors ever got as many eggs as he did during the winter or the year through."

Keeping poultry for eggs, to realize a profit and make a success, requires some experience; more, in fact, than most people imagine. Do not get the idea that all there is to it is getting some incubators and filling them with eggs and hatching them out in the spring and by fall have laying hens, and that, when eggs are high, you will be taking in some of the high prices that are quoted in the papers. That theory looks nice when you are not in the business.

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SCALDING A FOWL PROPERLY.

From *The Prairie Farmer.*

So great is the possibility of scalding the fowl improperly that dealers in some localities show an inclination to demand dry-plucked fowls. As a means of overcoming this difficulty, C. K. Graham, of Connecticut, who has spent a good deal of time in studying the subject, offers these suggestions: Any aged bird may be scalded without seriously injuring its quality if it is properly handled, but owing to the large number of poorly dressed scalded fowls, the market men place a premium of from 1 to 2 cents a pound on dry-plucked stock.

Boiling water may be used, but care must be taken not to leave young birds in the water too long, or the skin will cook, while with old fowls a little more time may not do any harm. The head and shanks should be kept out of the water, as the scalding will discolor them and make them unsightly. Immediately after the bird is taken from the scalding water it should be dipped into cold water to stop the cooking, and, as poultrymen say, to "plump the bird."

The bird should then be hung as for dry plucking, as no bird plucked on the lap or the table will have so good an appearance. If a scalded bird is exposed to a draught when being plucked or when cooling, the skin is likely to harden and become rough. It is because of these possibilities that dry plucking is recommended, as the condition of the skin to a great extent accounts for the high or low returns received.

SET HENS EARLY FOR LAYERS.

A writer in *Progressive Farmer* says: "There is one thing certain—the early hatched pullets are the money-makers. While I have been developing a strain of winter layers for several years, I have my foundation laid of early hatched fowls. While the feeding has a good deal to do with it—for fowls must be fed and properly cared for to get results—they must also be developed before they can lay. A hen that goes to laying early will generally go to sitting early. I find this one thing to handicap the poultryman and fancier in selling eggs for hatching. So many can not get their hens to sit as early as they wish; therefore they wait until late in the spring, and then set their hens on just any kind of eggs that come handy. Of course, this brings about more late pullets.

"I had hens sitting December 15, and from their broods I expect to get some very early layers. I always use hens to hatch and carry chickens, for I believe beyond a doubt that hothouse chickens are more lazy than those carried and trained by old mother hen. Some one may take issue with me on this, but I can't help it.

"It has been demonstrated beyond a doubt that the propensity to lay early can be perpetuated from generation to generation by breeding from such stock. It takes time and patience, but it pays to do so. If one does not care to breed up, it would pay him well to get stock that has been bred for that purpose. But, I say again, set all the hens possible early. By so doing you will be getting eggs next winter when they are high."

IMPROVEMENT OF THE QUALITY OF EGGS.

By Otto Maurer, Kansas Agricultural College.

The high cost of living has caused widespread efforts towards increased efficiency in methods of production and distribution of food products. The egg industry is an industry in which enormous losses are sustained through decomposition, breakage and incubation. He who has seen the wagon-loads of rotten eggs hauled from the establishments of big egg dealers must understand the tremendous waste. The value of the poultry and eggs produced in the United States, exclusive of insular possessions, represents about the same value as the hay or wheat crop, the latter being estimated at about 800 million dollars. Of course, the losses connected with the egg industry are correspondingly large, and it is a wonder that until very recently no efforts were made to save the millions of dollars lost by the spoilage of eggs.

The losses connected with the egg industry are due to incubation, decomposition and breakage.

Germination of the fertile egg begins in the body of the mother hen, and continues above 68° F. The normal temperature, however, is 103° F. Below this point development proceeds more slowly; above 103° F. it proceeds more rapidly. For instance, to produce a blood ring—that is, to make the egg unfit for consumption—seven or eight days are required at 90° F., while three days are required at 103° F., and only twenty-four hours at 105° F. It may be easily understood, therefore, that during the hot summer months the farmer and dealer has to use the greatest care to prevent the deterioration of fertile eggs. This should be remembered when we discuss, later on, the customary methods of handling eggs.

It has been found that a much larger percentage of newly laid, fertilized eggs contain bacteria than of unfertilized eggs. Bacteria are introduced into the oviduct, where they infect the eggs.

Incubation causes not only the loss of fertilized eggs, but indirectly also of sound infertile eggs. This is brought about in the following manner: During development of the young chick the latter derives the largest part of the lime it requires from the shell. Other material is also removed from the shell. The shell therefore becomes extremely brittle and very liable to breakage. Entirely sound eggs may be covered or soiled with the contents of such broken incubated eggs. This egg meat on the shell of other eggs soon teems with bacteria. Many of these bacteria possess the faculty to penetrate through the pores of the shell, invade the contents, and bring about their decomposition.

Considering the enormous losses caused by the incubation of market eggs, we might conclude that it is impossible to prevent them, since other-

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wise it certainly would be done. This, however, is not the case. It is ridiculously easy to prevent these losses. All the farmer has to do is to keep his male birds apart from the hens as soon as the breeding season is over. We have to educate the farmer to do his hatching as early as possible and then kill off the old roosters. The rooster generally causes considerable noise and disturbs many persons who keep poultry in limited quarters, yet his presence is endured because he is believed to be necessary. It has repeatedly been shown that the presence or absence of the male bird does not exert the slightest influence on the production of eggs. Moreover, in the absence of a male the hens are less likely to be broody.

There is, therefore, not the slightest excuse for the enormous losses caused by the fertilization of market eggs. This is due to carelessness and ignorance.

Decomposition can be prevented, to a great extent, by proper care of the fowls and eggs. Decomposition is almost exclusively due to the activity of microörganisms. These microörganisms, especially bacteria, may infect the egg during its formation as well as after it is laid.

EFFECT OF CORN ON COLOR OF EGG YOLKS.

From *The Feather*.

The Maryland station recently concluded experiments to determine the effect of corn on the color of the yolk of eggs. A flock of 120 Single Comb White Leghorns were divided into three lots of 40 each, and were housed and cared for alike, except that one pen received its whole grain in the form of corn, another in the form of wheat, and the third received a mixture of corn and wheat. All pens were allowed free access to narrow yards, which furnished a very limited amount of green stuff. All the eggs laid by these pens were saved, and, after boiling, were cut in half and placed in parallel rows for comparison. In every instance the eggs from the corn-fed lot showed yolks with a deep yellow color. Every egg from the corn-and-wheat-fed lot had a yolk of a good yellow color, while with but three exceptions the eggs from those fed wheat had yolks of a very pale yellow color. The three exceptions can probably be accounted for by some of the hens getting green food from the yards. Another test was made subsequently with white corn and the yolks were a very pale yellow.

As a result of the tests it was concluded that yellow corn, when fed to hens in the proportion of 9 parts corn to 12 parts mash, gives a very deep yellow color to the yolk. Yellow corn, when fed to hens in the proportion of 4½ parts corn to 16½ parts of other foods, gives a noticeable yellow tint. Wheat, when fed in the same proportions, does not give any yellow color to the eggs, and white corn is no better than wheat, so far as furnishing a tint to the yolk is concerned.

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"EGGS-TRAVAGANCE."

By MRS. W. C. OFFER, in *The Poultry Tribune.*

During the past winter a lecturer of considerable reputation visited our city and said in the course of his address, "I wish the American people might learn to hate waste." He must surely have had the egg business in mind when he made the statement, for the losses in that one item are enormous.

Dirty eggs ought not to be sent to market, neither ought eggs from a stolen nest be sold, unless candled to be sure of their condition. Dirty eggs always sell as seconds. At present the farmer gets just one price for eggs, in many places, at least—this price regardless of whether eggs are clean or dirty, large or small, varying or uniform in color. But finally these are sorted and a fancy price paid for the fancy product. The time is not far distant when the energetic, down-to-date farmer will participate in this fancy price, because market conditions will be different.

The cold-storage people have half a dozen different classes into which the eggs they handle are divided. To-day the farmer-producer gets paid for the medium grades, even though his product may be all "firsts." Is this right? If not it is "up" to the farmers to make it right.

At a recent meeting of the Carload Wholesale Produce Shippers of Kansas and Oklahoma it was stated that "the egg industry has become one of the most important of the United States, but the managing of the product has been left almost solely to the barnyard hens under the intermittent care of the women and children."

The shippers decided to start a campaign to educate the people in care of eggs. They adopted the following suggestions, or "Don'ts":

Don't keep mongrel stock.

Don't hatch your next winter's layers after June 1.

Don't allow the male birds with the flock after you are through hatching.

Don't compel the hens to make their nests in the weeds and under the buildings. Provide one nest for every four hens.

Don't allow the nests to become filthy.

Don't set hens where other hens can lay in the same nest.

Don't wait until ready to go to town before gathering eggs.

Don't keep eggs in a damp place.

Don't keep eggs in a kitchen or near a fire of any kind.

Don't sell eggs that have been gathered from a stolen nest. Such eggs should be used at home.

Don't wash eggs.

Don't expose eggs to the sun's rays when taking them to town.

Don't sell eggs case count, but demand that your eggs be candled.

Don't hold eggs over three days in warm weather.

Don't market eggs that have been in the incubator.

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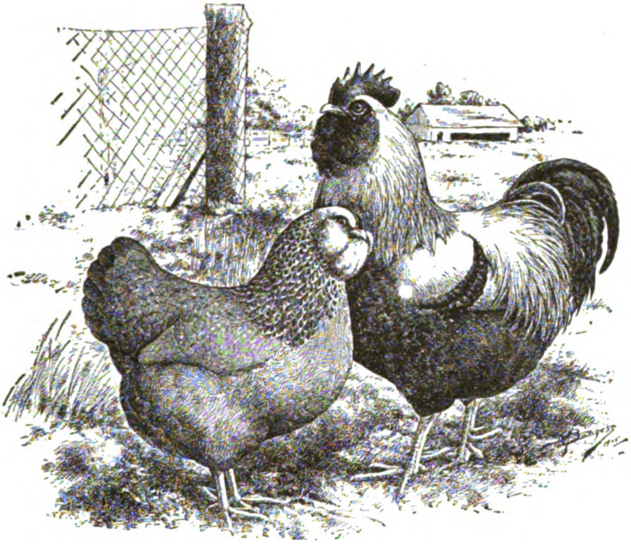
Don't keep eggs in a tight vessel of any kind.

Don't market small or dirty eggs. Use them at home.

Don't keep eggs near oil, onions, etc., as they readily absorb odors.

It was emphasized that hens will lay more eggs when the male birds are kept away from the flock, and that infertile eggs will keep indefinitely, even in the hottest weather, and much longer than fertile eggs.



A pair of Faverolles.

SELLING EGGS BY WEIGHT.

The North Carolina Experiment Station has published some interesting notes concerning the sale of eggs by number or weight. The eggs of a number of breeds of hens and pullets were carefully weighed and their comparative value computed. As a rule, the eggs of hens were larger than the eggs of pullets of the same breeds.

The largest eggs of any breed of hens were those of the Light Brahmas, these weighing 28 ounces to the dozen. Eggs laid by Barred Plymouth Rocks and Black Langshans weighed a trifle more than 26 ounces per dozen. Brown Leghorn, late-hatched Plymouth Rock, White Wyandotte and Buff Cochin eggs weighed from 21.7 to 23.7 ounces per dozen. The heaviest pullet eggs were those of Black Minorca, which weighed 26.5 ounces per dozen. The lightest pullet eggs were laid by Single Comb Brown Leghorn and Silver Wyandotte pullets, these weighing 17.5 and 22.1 ounces respectively. All these eggs were worth in the local market at the time the matter was being investigated, 13½ cents a dozen. Taking the eggs of the Single Comb Brown Leghorn pullets, which were the lightest, as the basis of comparison, we can easily compute the value of those of the heavier weight. The Brown Leghorn eggs weighed 17.5 ounces per dozen, and at 13½ cents per dozen were worth almost exactly 12 cents a pound. This would make the eggs from Brown Leghorns, weighing 21.7 ounces per dozen, worth 16.3 cents per dozen, and those from Light Brahma hens worth 20.7 cents per dozen, or about 60 per cent more than the price the market offered for them. The experiment did not cover comparative cost of product, etc., and no conclusion was drawn as to the most profitable breed.

THE MARKETING OF EGGS.

By C. S. Plumb, in *The Journal of Agriculture.*

I have a young friend, Jim Robbins, who has the "hen fever." At least, that is what many people call it. You can tell cases of it by these signs: The "fever" patient begins to talk very much about poultry. Then he either gets an incubator and sets some eggs, or buys live chickens. Next he subscribes to a poultry paper and buys a book or two on hen farming. From then on he is always talking about feeding, breeding and chicken houses, and lice, and gapes, and all sorts of things. In the morning he rises with the robins and makes a bee line for the chicken house. If he is a married man he looks sharper after the hens than he does his family. If he has the "disease" very bad he is a close friend of every bird in the flock. He rather likes to pick up his best birds, to spread their wings, or open their feathers on the back or breast to show what perfect specimens he has. He is sure they will score 100 at the show.

Now you will want to know what this has to do with selling eggs. Just this: Jim was eager to learn. He knew that there were agricultural schools where they kept large flocks of chickens of different kinds and gave boys lots of information on poultry. So Jim told his father he wanted to go to a poultry school. He lived in Southern Ohio, where every farmer keeps chickens. Mr. Robbins thought perhaps it would be a good thing if Jim could get some new ideas on chickens and eggs. He did n't know much about poultry schools, but he was willing to take his chances on Jim. It would n't cost much anyway. That was in November. In January the boy went to the poultry school, and came back home in March, after taking a ten-week course.

It was a showery sort of an April day, and I met Jim in Marshall's general store, where I had a little business. One couldn't do much on the farm anyhow. Marshall shipped a good many cases of eggs during the year, especially in spring. Jim told me a bit about his experiences away at the school. He said he had learned lots about eggs—things he had never noticed before. Business was dull in the store on account of the rain, so I said, "Jim, just to pass away the time, let's open up one of these cases of eggs, and you show us a few things, if Marshall does n't mind." Mr. Marshall did not object, but rather fancied the idea, so the cover was taken off.

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"At the college," said Jim, "we had a big workroom where we learned to make these egg cases, and we could put them together mighty fast. They are light weight, but have to be nailed together strong. If they are not built right the bottom may fall out, which is bad business.

"A case of eggs holds thirty dozen. You see the eggs are in layers of six dozen each, so there are five layers in the box. Each egg is in a place by itself, of just the right size, with cardboard all around it. Of course you knew all about that, so let's talk about the eggs."

At Jim's suggestion, we took the eggs from the case and put them in a washtub, so we could see them all together.

"There are a few things," said our young educator, "that we soon learned at the college. One was to fix up the stuff to be sold so that it would please the most particular customer. All kinds of products are now prepared for market by sorting and grading, but our farmers down here don't seem to realize it. Professor Smith told me that our county sold $200,000 worth of eggs every year. You know that most of them are shipped out just like these in this case. The first thing you see in this case of eggs is the difference in size. Now, to show you what this amounts to, let's sort them over and pick out three sizes—the smallest, the largest, and one between the two."

As we picked the eggs over I saw that there was more difference in size than I had supposed. We put one dozen of each kind by itself on the scales.

"There," said Jim; "what do you think of that? A dozen of the biggest ones weigh 30½ ounces, the medium-sized dozen weighs 26½ ounces and the small one 21¾ ounces. Now suppose we do a little figuring here. Let us find out how much a case like the large and small ones would weigh, if we had a case of each kind."

After we had figured it out we found that a case of the big eggs would weigh 57 pounds 3 ounces, while the small eggs would weigh 40 pounds 12 ounces. That certainly was astonishing to me.

"Now," said the young professor, "some varieties of chickens lay a great deal larger eggs than others do. I had my attention called to that last year at the poultry show at Columbus, when the Agricultural College showed a collection of eggs of different varieties. The Leghorns lay small eggs and the Minorcas big ones, and they had a dozen of each side by side, with the weights marked. As I remember, the Leghorns weighed 22 ounces and the Minorcas 27¼. That really is a big difference.

"I think eggs ought to be sold by weight. Eggs are food, just like meat, and I believe we should pay for the amount of food we get in our eggs, just as we pay for our roast of beef, according to its weight. In some countries in Europe they sell eggs by weight, and we were told that it is the only fair way to do."

It surely did look, on the face of it, as though Jim had the right side of the argument.

"One of the things that people who buy food expect these days," said this young egg expert, "is a neat, clean, nice-looking display of what they are to buy. You notice that in this case of eggs are some dirty, bad-looking ones scattered among the clean, fresh-looking ones.

"You know a newly laid egg has a clean, dull glaze all over the shell, and it doesn't show a speck of shiny soil. Old eggs look brownish or dirty and lack the fresh appearance of the egg just dropped in the nest. Now we ought to be careful not to send stale-looking eggs like those to market. They hurt the trade. They sell for less money in the market."

"Mr. Marshall," said Jim, "will you let me see your last Chicago paper with the egg quotations?"

The paper was brought, and there under the head of "Eggs" were the prices of different grades of eggs in Chicago and Boston. I noticed that "dirties" were about the lowest priced of any quoted in those markets. "No. 1 dirties" were quoted at 12 cents a dozen, compared with 17 cents for those "90 per cent fresh, packed for city trade." Of course, these last are packed in cases after being selected. I saw that Jim had shown us another thing worth profiting by.

"When in school," said the boy, "we were shown several ways to grade or sort eggs. The difference in weight is quite important, but people want them graded in other ways, too. You notice that most of the eggs in this case are white, but quite a number are brown. Some markets prefer brown eggs and some white. Some people always want to buy brown eggs and others white ones. It is simply a fancy, a fad. Brahmas lay brown eggs and Leghorns white ones, but there is no difference in their food value. Yet if one can send eggs of a uniform color to market it will be a good thing for the trade. I noticed in the paper we were just looking over that in New York "gathered white" were quoted at 17 to 19 cents, and that "gathered brown" were 16 to 17 cents a dozen. This simply shows you that people look for a color of egg that attracts them, just as they have preference in color with other foods. If I was to build up an egg trade of my own I would ship eggs of a uniform color to the market that would pay the best price for them. A case of clean, all brown eggs, or all white eggs, with the name of the farm they are from stamped on each egg, is the best advertisement one can ask for.

"There is just one more thing about this lot of eggs that you may not have noticed especially. If you look carefully you will see that they differ quite a bit in shape. Some of the eggs are almost round, some are long and slender, some have one side bulging out more than the other; they differ more than we are apt to think. The Agricultural College had in the exhibit at the Ohio state poultry show at Columbus, that I spoke of a while ago, two dozen eggs that were side by side. One dozen had been sorted to make a uniform exhibit in size, shape and color, and the other dozen were unsorted. In a whole case of eggs we do not notice the shapes so much, but I remember that in that unsorted dozen, No. 5 was almost crooked, No. 8 was almost round, and No. 12 was long and slender. I am sure if one had those two different dozens of eggs for sale in North Market in Columbus, that plenty of people would pay two or three cents more a dozen for the sorted lot. They would look better and more attractive, I am sure, and in this case the sorted dozen weighed the most."

While we were talking a little girl came running in with a big egg in her hand, about all she could manage. She held it up, saying, "See what one of mamma's hens laid to-day. Mr. Marshall, will you give me some candy for this? The obliging storekeeper took the egg and the youngster

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received candy in exchange. As the girl left Jim took the egg and put it on the scales, and it weighed 3¼ ounces.

"This double-yolked egg," said Jim, "is about a third heavier than one of those other heavy eggs," holding the two up together on his hand. "A dozen of the big ones will weigh 39 ounces, compared with 30 ounces for the other. This egg has two yolks, and is a good example of unfairness in selling eggs as big as this, by the dozen method. Of course, double-yolk eggs are not common, but they are eggs all the same.

"We do not pay as much attention to our market eggs in America as we should. In Denmark the egg industry is very carefully managed. There is coöperation among the farmers, and the eggs are gathered from the farms and taken to the city, where they are carefully examined and sorted. Of course, the first and most important thing about an egg is that it be fresh. It also must come from a flock that has been properly fed. While I was in the poultry school we studied the influence of foods on the quality of the egg. We chopped up some onion and mixed in the mash of one flock and for some days after the eggs from those hens had a strong onion flavor. That little onion just about ruined those eggs for our customers. But that simple experiment taught us a valuable lesson. People pay well for carefully sorted eggs, of uniform size and color, fresh, and of first-class quality. The college could easily get ten cents a dozen above the market for eggs of that kind."

The rain had cleared away, and it was time to get back to the farm. The eggs were put back in the case, and to-morrow would be on their way to feed the hungry in the distant city. That particular case had been the means by which a young chap taught me a valuable lesson when I was least expecting it. As I thought it all over afterwards, I felt convinced that these poultry schools were a good thing. They had practical teachers there, Jim amply demonstrated, so that the boys got in touch with the true spirit of education. With extensive chicken yards and different kinds of poultry, bred and fed to secure the best results, why should not young men and women be inspired by that kind of training? That is the sort of instruction that turns young men back to the farm rather than from it. Education of that kind is destined to revolutionize the agriculture of our state and make the farming of the past seem dull and unattractive compared with the pleasures to be derived from doing things based on results secured from scientific and practical training in the why and how.

"Jim," said I, as he started along up the road toward home, "did the boys at the poultry school enjoy the work?" "Did they?" he replied, "Well I should say so. Those boys were the most interested crowd I ever saw, and you can be sure that they will preach poultry education seven days a week from now on. We each came back home with worse cases of 'chicken fever' than ever."

An opossum eats the head and neck of a fowl, and kills only one or two at a time. A mink bleeds his victims in the neck and sucks the blood, and will slaughter a dozen or more birds in a night. Both leave the carcasses in the coop or house.

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THE PRICE OF A SETTING OF EGGS.

From *American Poultry Journal.*

The beginner in poultry work often holds up his hands in astonishment when a high price is mentioned for a setting of eggs. He used to think that $1 was too much for fifteen eggs; but when he thinks of $5 for a single egg it is beyond him. One may well wonder at the difference in price on fifteen eggs. You can follow the advertising in any poultry journal and you will find hatching eggs quoted at any price from $1 per setting up to $30 for fifteen eggs. You may well wonder at the difference. One dollar for a setting of eggs from thoroughbred stock is very cheap. If the quality is there it is a bargain. However, how about the thirty-dollar eggs? Will they be worth the money? Will it be a profitable investment? It might be cheaper in the end to buy these than to pay the dollar for the setting first mentioned. The thirty-dollar eggs represent breeding that is of a very high quality. It is better to start with less chicks and start right than to have a whole yardful of chicks from some poor strain. You will have to breed year after year from the offspring of your first purchase. Now, would it not be cheaper in the end to buy good eggs from some good, reliable breeder and pay the price than to get inferior eggs from inferior birds?

The man who wants to begin poultry work should look at this question of hatching eggs from every standpoint. Some will want to buy several hundred eggs and get a big start at once. This will mean that he will not have sufficient brooding space and accommodations, with the result that he will lose about half of the chicks. His work will be in vain. He will not know how to meet the many emergencies that come up, and he will have trouble all along the line. It is better for the beginner to start with a few chicks and have them from eggs laid by well-bred birds. If you are going in for egg production, get a setting or two of eggs from some one who has been breeding for this for years past. If you want show stock, then get your eggs from some of the breeders who are constant winners at the shows. It is better to pay a fair price for the eggs than to get a lot of them from stock of unknown quality. If you can not afford to purchase more than thirty or fifty eggs, get good ones and then do your best with them. If you get enough to fill an incubator, see to it that your machine is in running order before intrusting the eggs to it. Get the best eggs that you can afford, and let the dollar eggs alone unless you are sure of the quality. You can get good eggs from $2.50 to $5 per setting that will give you the best results. Results are what you are after, so don't be put off with cheap hatching eggs if you can afford to get the better class.

Your future business in poultry depends upon the class of stock that you start with. If you get the cheap hatching eggs without the quality back of them you will have a hard row to hoe, for lots of people have the cheaper stock. If you buy eggs at $3 per setting, then later on you will

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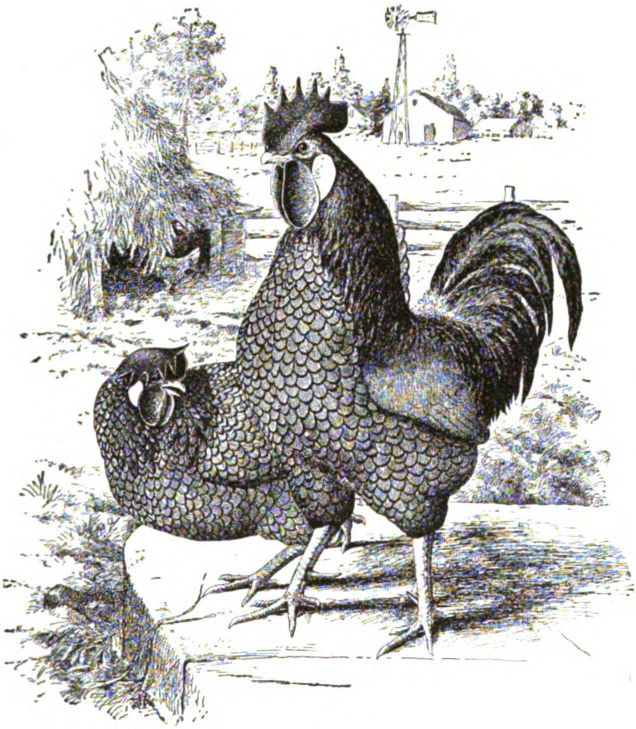
be justified in getting as much for your hatching eggs. If you are careful and improve the quality of your flock, then you will have reason for asking a fair price for both eggs and stock. It is unfair to a breeder to ask him to sell his eggs at as low a price as some other man, when for years he has been working up a strain and has fine stock.



A pair of Blue Andalusians.

Sometimes a person finds more than he is looking for, like the old maid who desired to see the equator. She kept pestering the skipper about this girdle of the earth, and he solemnly assured her that she should see it when the boat crossed the line. Arriving in the equatorial parts of the sea, he handed her some field glasses, and told her to look steadily down at the water. Then he pulled a red hair from his head, and stretched it across the field of the lens. "Do you see it now?" he asked. "No, I don't. Oh, yes, I do. It is red, and a camel is going across it at this minute!" she exclaimed. Neither she nor the skipper were looking for that camel. It is the same way, sometimes, when you look for some mysterious cause of disease among your fowls, and find, after all, it is only a louse and his family.—*Poultry Fancier.*

CARE OF HATCHING EGGS.

By FANNIE M. WOOD, in *The Ohio Farmer.*

Satisfactory results can not be obtained with the incubator unless we are very careful about the quality and the age of the eggs placed in the machine.

Eggs intended for hatching at this season should not be allowed to remain in the nest until they become chilled; and they should be kept where an even, medium temperature is maintained. Keep them in a room where the temperature gets too low at night and you will be sure to get a poor hatch, and the ones that do get out of the shell will be weak. Too high a temperature begins development of life. They will be less likely to be affected by changes of temperature if the receptacle in which they are kept is lined and covered with several thicknesses of newspaper.

The eggs should be turned each day to keep them in best condition for hatching. We keep them in low, flat boxes; as we gather the eggs we pack them in these boxes, using egg fillers. The lid is firmly held and boxes inverted every day.

We are careful not to jar them at any time while handling them. It is not easy to see a small crack in an egg; so be careful about letting them roll together in a large basket while gathering.

Better pick up fresh eggs here and there among your neighbors than to keep them too long while trying to get enough of your own to fill the incubator. Two weeks is the longest that eggs should be kept. If possible, have all your eggs less than two weeks old; then there will be no perceptible difference in the hatching. If other conditions are right, fresh eggs will hatch on time and the chicks will be more vigorous than the ones from eggs kept too long. The older ones drag along, chicks remaining in the shell two or three days longer, giving an uneven hatch.

Another thing that we find gives a more even hatch is having eggs of the same size and shape as nearly as possible. Early in the season we get more misshapen eggs and overlarge and undersized ones than we do later. These are rejected, and only nice, smooth eggs are saved. Eggs with thin, fragile shells are not fit for hatching, but we seldom get a thin-shelled egg when our fowls are well supplied with oyster shell. Eggs with watery-looking spots on the shell never hatch well for us, and they are easily broken.

Proper care and selection of hatching eggs may seem like too much trouble for some folks, but it pays, especially at this season. There is not so much difference in incubators as many believe, but there is quite a difference in the eggs used.

Don't get in too big a hurry to start the incubator and put just any kind of eggs in it, and eggs that have been carelessly handled. You can't expect the machine to perform miracles.

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HENS *vs.* INCUBATORS.

By E. H. Hoffman, in *The Poultry Tribune.*

Every year during the hatching season the question arises as to whether the old-fashioned way of hatching chicks with sitting hens or the use of the artificial method is the most advisable. Some fanciers, who raise annually about a hundred or two hundred chicks, claim they are more successful with hens, while others declare that the natural way is out of date and the incubator is the only modern method. Here is a chance for an argument, because both methods have their good as well as their bad points.

Of course, for the large poultry raiser, the one who is in the business on a large scale, sitting hens are out of the question; but in this article I will deal only with the small breeder who raises a limited number of birds for breeding and show purposes. In the first place let us discuss the sitting-hen proposition. Take it early in the season when the hen desires to set; we place a batch of eggs under her, and possibly we are successful in hatching six or eight chicks. The next hen may not be set until a week or two later, and she hatches a like number. We now have two ages, and each must have a separate place. The chicks are too far apart in age to give them all to one hen, and still neither has enough to make it worth while bothering, but still we have the chicks and they must be given care. Later in the season when more hens become broody it is possible to set six or eight at one time, and when the chicks hatch they can be placed together and a couple of hens may be able to take care of the entire lot. But as long as hens are being set from time to time we have the trouble of large and small chicks, and that always causes trouble.

Sitting hens are not all alike. Some have a motherly disposition and seem to delight in taking care of chicks, even if they are of different ages. Others have an ugly disposition and kill any chick that happens into her coop if it comes from another brood. I have found hens that would adopt chicks of all ages and remain with them even after they started to lay. Others begin to wean them at the age of two and three weeks; but the majority of hens take care of their young until they are four or five weeks of age.

I know a number of fanciers who hatch all their chicks with hens, and immediately after they are hatched they are taken away and placed in brooders. This method proves reasonably satisfactory and the chicks appear to thrive. One of the worst features of the hen is the fact that she steps upon the chicks and often makes cripples out of them. When the tiny chicks are placed in a brooder there is no danger of losing them from this cause. Another thing that figures against the hen is the fact that she is a louse breeder, and chicks that run with her are bound to become infected with body or head lice. There is very little danger of losing chicks from head lice when they are cared for in brooders. I have had hens that killed their chicks after greasing the heads to prevent the head lice. In such cases the hens must be removed and other arrangements made. Sometimes a good-natured hen can be found to adopt them.

While there are many trials and tribulations in handling sitting hens, the incubator is not always satisfactory either. Many a hatch has been lost simply because the person operating the incubator did not understand it. It is an easy matter to operate a machine, but too many persons believe that the machine will run itself, and fail to give it the proper attention. The temperature should be closely watched from the time the eggs are placed in the machine until the chicks are hatched. After the first week the temperature should not be quite so high and the lamp may be turned down slightly, because the animal heat created by the eggs has a tendency to run up the thermometer.

After a machine has been run a couple of times one learns considerable about it. But even the old, experienced hands sometimes have a bad hatch. Often it is the fault of the operator, who fails to look after the details. Lack of moisture is very often the cause of poor hatches, but this can be easily remedied. Even eggs under hens must be looked after in this respect. I have found it a very good plan to moisten the eggs three or four days before they are due to hatch. The tough, white skin which surrounds the chick in the egg is often so dry that the tiny chick can not break it. In such cases the chick must be assisted or it is likely to die in the shell.

Incubators are becoming more and more popular, and many of the machines on the market are so near perfect that a novice can easily learn to run them. I believe the time is coming when nearly every poultry fancier, whether raising fowls on a large or a small scale, will use an incubator and abandon the sitting hen. As I stated in the beginning, both methods have their faults, but in the long run the incubator is probably the most satisfactory.

It is a deplorable fact that the majority of the farm poultry buildings are neglected. Our farmers do not give them enough of their attention, and suffer financially as a result. In the Middle West there is little indication of any special effort on the part of the farmer to provide clean, comfortable quarters for his fowls. He seems to take it for granted that the fowls, unlike the cattle and other live stock, do not require comfortable quarters. A not uncommon practice on many farms is to clean the poultry house only once or twice a year. The accumulations of filth and droppings on the floor often cause infectious diseases, and the droppings from one sick fowl may be the means of infecting the entire flock. Fortunately, however, there are many—the great majority, in fact—who know how to raise their poultry. These farmers are progressive, up-to-date men, and a credit to the country. The poultry production is unable to keep pace with the ever-increasing demand. Now is the time to remodel your poultry buildings and take renewed interest.—*Farmers Home Journal.*

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HATCHING CHICKS WITH HENS.

By Eugene Carr, in *American Poultry Journal.*

In the northern states and Canada March is a very cold month, and a successful hatch with the sitting hen can not be had; and even if you do hatch out a few chicks you will have a hard time to raise them. May and June are the two best months to hatch out chicks with the sitting hen. In fact, chicks that are hatched out in these months are stronger and grow faster than when hatched out in other months. If you have a poor hatch do not blame it on the hen, for in many cases the eggs are not strongly fertilized and are not from a perfectly healthy and vigorous breeding stock.

All who raise poultry, it is needless to say, have their own way of setting and caring for the hen and the chicks. I am going to tell you the way I always care for the sitting hen and the chicks. This way always proved a successful one to me, and I am sure it will prove the same to you. Many poultrymen claim that the nest made on the floor of straw—each nest being separated by a strip four or four and one-half feet in height—makes a very good one. The reason they give is, that the hen set in a nest of this kind will be able to walk onto the nest and not be compelled to fly up to the eggs, in which way she is apt to break some of them. Another reason they give is, that the eggs when placed on the floor do not dry out so quickly as when placed higher up.

This way may be all right, but if a person will pick out a medium-sized hen when he wants to set one, and place a long running board before the nests, he will have no trouble in eggs being broken. If you want the eggs moistened, just take a shovelful of dry dirt and place it in the nest, over which place the straw; this will do just as well. In this respect, however, I would advise you to place a shovelful of dry lime under the straw instead of the dry dirt, as last year I placed some dry lime in the nest and hatched twelve chicks from twelve eggs.

It is a very good plan to set all the sitting hens about the same time if you can. The best time to take the hen from the nest and place her in her new quarters is after dark. In each nest in which you intend to set a hen place a few glass eggs, and in front of the nests place a wooden frame covered with wire, which, of course, is made beforehand. Carefully place the hen upon the glass eggs, and before the nest place the wire frame. In some cases the hen when placed in her new quarters will cause a great rumpus, but this does not often happen. If the hen continues the disturbance, take her from the nest and place her on the roost, for a hen of this kind is never a good sitter or a good mother. She will also distrub the other sitting hens if you allow her to continue. The place where the sitting hens are kept need not be so very dark, but still not too bright. The hen should not be disturbed or taken from the nest until the second day after you have placed her in her new quarters. The morning of the second day take the wire from in front of her nest and let her come out and eat. The sitting hen should be fed nothing but cracked corn, and at all times she should have fresh water, clean grit and charcoal before her. There should also be a dust box in the coop, so that she may clean herself. After the hen has eaten and drunk enough you should let her go back to her nest. After she has gone back to the nest, take her from the nest carefully and have some one hold her while you shake some lice powder on her, and at the same time take the glass eggs from the nest and put in their place the ones you wish to set her upon. Do not let the hen upon the ground after you have shaken the powder on her; if you do she will shake the powder off, and, of course, derive no benefit from it. Now place the hen upon the eggs and put the wire frame before the nest.

The way I have of letting the sitting hens off to eat and drink is to let them off one by one. You will not lose any time by doing this, for when you take the wire frame away from in front of one nest, allowing her to come off to eat, you can, no doubt, do something else. When she has finished eating she will go back in her own nest. Then you can place the cover in front of the nest and take the cover away from another nest, and let that hen out to eat while you go about your other work, and thus continue until they are all attended to. In this way you prevent the hens from fighting, which they would do if you allowed them to come off their nests at the same time.

Now, you wait patiently for the three weeks to expire. Good, sound chicks should be out on the twentieth day, and those after the twenty-first day seldom amount to much. The chicks should be given nothing to eat until forty-eight hours after the hatch, except water and fine charcoal. About twenty-four hours after the hatch they should be taken from the nest and placed in the little house you have for them. Anything will do to keep them in if it affords shelter from the weather and protection from cats and rats.

It is said that William Cook, originator of the Orpingtons, claimed that he could select a good laying hen every time by observing the short feathers that grow on each side at the base of the comb. If these feathers curl up and are inclined to point forward the hen is a good layer, and if they lie smoothly, the points lying flat, the hen is a poor layer. A good laying hen usually has a comb rather larger than the average of her breed. The comb is bright red; the eye bright; neck rather longer than the average; breast broad and somewhat receding from top to bottom; back long and wider at hips than shoulders; abdomen deep, the lower line being lower than the lower line of the breast; tail well spread; legs wide apart. An examination of the pelvic bones will show that those of a good layer are far apart. A good layer, even when not laying, shows the pelvic bones well apart, although not so far as they will be when she is in full lay. If the bones are close together and hard to press apart the chances are that the hen is a very poor layer.—*American Poultry Advocate.*

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HOW TO PROPERLY SET HENS.

By D. C. Adams, in *Successful Poultry Journal.*

Setting the hens is a matter of importance where the poultryman depends on the hen for incubating. The location of the nest is the first thing to be considered, and it is one of the many things connected with the proposition that should have careful consideration. The nest should be in a secluded spot where no one but the attendant has any business to go. The hen wants to feel that she is alone, like the wild birds in their natural state. It should be on the ground floor and so arranged that it can easily be kept sweet and clean and where the hen can exercise and dust while off the eggs. The nest should be eighteen inches square and made with two sides and a top. They should be made single and not in sections, so they are easily handled and easily cleaned. The back should be covered with one-inch wire netting, and the box should be set six inches from the wall, so it will be cool and airy. The front should have a burlap curtain so arranged that it will slide up and down to darken the nest while the hen is on it.

If set on a board floor, a shovelful or two of fresh earth should be placed in the box and formed round into the shape of a nest. Then cover with long hay, shaping it with the hands into proper form, and put on a second layer of cut hay about two or three inches long. Into this place a nest egg and see that everything is ready for the hen. At night place her gently on the nest and pull down the burlap curtain, leaving her alone until morning, when the curtain should be raised. If she refuses to leave the nest for feed in one hour, the curtain should be drawn down again. If she refuses to leave the nest on the second morning the attendant should gently lift her off, placing both hands under her, grasping her by the two thighs to prevent her from struggling and destroying the eggs. If she does not return in fifteen or twenty minutes she should be lifted on again. See to it that she has plenty of good feed always before her. A self-feeding hopper is best, and corn is one of the best grains, because it keeps the hen from getting too thin, which she will if not given fat-forming food. It also helps to keep up the heat of her body. Plenty of good, fresh water should be within easy reach, also grit and charcoal. If the floor is a board floor it should be sprinkled with a good coating of sand and cleaned thoroughly every morning, removing all droppings to keep the sitting room sweet and clean.

While the hen is off the nest the eggs should be examined, all broken eggs removed, every dirty egg washed in warm water, and the nest made clean again. This is very important, for if allowed to remain in a filthy condition the nest will soon be swarming with lice. Before placing the hen on the nest she should be well dusted with some good lice destroyer, and once or twice a week afterwards, dusting her the last time just a day before the eggs pip. Don't forget the dust bath. It is nature's own way of cleaning a hen, and we can't improve on that. Road sweepings into which has been sprinkled a little sulphur make a good bath.

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If more than one hen is sitting at the same time the eggs should be tested out, and when two hens' eggs can be placed under one it should be done. The other hen may be sent back to do business in the laying yard; if short of broody hens, she may be set again. It should be borne in mind that she must stay on the nest longer than her natural time, therefore, must have special care and everything done for her comfort. It is not enough to care well for them the first week or the second week, but this good care must extend right through the twenty-one days of incubation.

The eggs should begin to pip by the twentieth day at night, and then we hear that long-expected peep—that sound which carries with it a temptation to look—but we can not help the hen, and she is better left alone, because anything we do will only excite her and probably cause her to kill some of the chicks. At the end of twenty-one days, or when the hatch is all off, the hen should be gently lifted from the nest and all eggshells removed and the nest thoroughly cleaned, throwing out the old nest material and replacing it with clean hay; put the chicks back into the nest, then allow the hen to return; pull down the burlap curtain and let them remain unmolested for thirty-six hours. If the hen comes off for feed during the thirty-six hours, she should be fed whole corn. This is satisfying and will cause her to remain on the nest longer than if she was fed on cracked corn or any of the smaller grains. This gives the chicks a chance to rest, which they very much need. No food should be given them until at least thirty-six hours old, and forty-eight hours would be better.

At the end of the thirty-six hours the hen with her brood should be removed from the sitting-room nest and placed in a coop about two feet six inches deep and three feet long, two feet six inches high, with a well-sloped roof to shed the water. It should have a double front—one of lath, running lengthwise, and not up and down as is the common rule. This keeps the hen from moving up and down while her head is out, thereby saving many chicks that would be trampled to death if the laths were running perpendicular. It should have a solid bottom, so it can be moved at night to a fresh spot while the hen and chicks are in it. After they are settled in their new home let them rest until next morning, when they should have their first feed. We place a board about one foot square outside the coop, on which their first meal is spread. Toast a piece of bread in a good, hot oven until it is almost black, then crush it with a rolling-pin; also crumble up a cracker, if you have some handy. Mix this with crushed eggshells and coarse sand, adding a little charcoal, and give good, fresh water. This treatment will give the chicks a good start in life.

If you want fall and winter eggs, feed enough wholesome food to make them. Don't expect a hen that gets only sufficient food to keep her alive and warm to prove a paying producer of eggs. To get eggs you must furnish a sufficient surplus of food material, above actual body needs, for the making of eggs.—*American Poultry Journal.*

THE GENTLE ART OF SETTING HENS.

By A. C. RASAR, in *The Farmers Mail and Breeze.*

To get a satisfactory hatch one must have a satisfactory hen to do the hatching. Never use a wild, lousy or scaly-legged bird. Very large and heavy hens are not good either, because of the greater tendency to break the eggs. As to size, we have found that hens weighing from five to seven pounds and those that have smooth legs are best for sitters.

In getting a hen ready for hatching, free her from lice by using insect powder frequently, and if necessary dip her. If her legs are scaly apply equal parts of coal oil and lard and rub it well under the scales. Two or three applications may be needed to kill all the scales. It is a good plan to handle the hens while in winter quarters and get them tame before the brooding season comes.

A good place for hatching may be made by setting up several twelve-inch boards parallel to each other and boarding up the ends. Fasten poultry wire over the top and cover one end, where the nests are to be, to keep the hens dry while sitting. The ground should slope away from the nests. Thus you have nests and runs where the hens can not bother each other or be disturbed by other birds or animals. When hens are set indoors sprinkle the bottom and sides of the nest well with lice powder. Press down the hay in the nest until almost flat. A deep, rounded nest will cause more broken eggs than a shallow one.

Let the hen sit where she started for two or three days, then put her on the eggs at night. Shut her up on the nest for a day, then when she comes off have grit and water near at hand. Corn is good for food, as it produces heat and the hen can fill her crop in a short time. Remove chicks as soon as dry and put them in a warm place, covered with a woolen cloth, until the hatch is finished.

A cockerel is a male bird less than a year old. A cock is a male bird over a year old. A pullet is a female bird less than a year old. A hen is a female bird over a year old. A yearling is generally one counted as having laid twelve months. A setting of eggs is thirteen, although many poultrymen have increased it to fifteen. A broiler is a bird weighing two pounds or less and from 6 to 12 weeks old. A spring chicken is a young bird weighing over two pounds. A capon is the male bird deprived of its generative organs for the purpose of improving the weight and delicacy of its carcass. A stewing chicken weighs about three pounds. A roaster weighs four or more pounds. A poult is a turkey in its first year. A poulard is a pullet deprived of the power of producing eggs, with the object of great size. A trio is a male and two females. A breeding pen is generally made up of from six to fourteen females and a male. The male chicken is called a cock, the male goose a gander, the male duck a drake, and the male turkey a tom.

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ABOUT HATCHING TIME.

By Mrs. J. B. Howe, in *Farm Press.*

March or early April hatched chicks usually make sturdy fellows. If wanted for fries, they soon attain that condition; if desired for next season's breeders, with proper care they will have size and bone; and if desired for the fall or winter's early shows, if of the right kind of stock, they will not be a disappointment there.

One great requisite in regard to these early chicks is that the parent stock is in good health and vigor. If they have been fed condiments to force winter laying, the eggs will be weak in germinating power and the chicks feeble. If the hens have been overfed and overfattened upon corn, the eggs are apt to be few in number and often ill-shaped.

To have the very best of success both with winter eggs and eggs for hatching, there should be at least two pens of fowls, one of early hatched pullets and one of one- and two-year-old hens. The early pullets should have been matured and fed in such a manner that they have just begun to lay before they enter winter quarters, or just after. They should be penned by themselves and fed an egg-laying ration. If cared for rightly they will soon be paying not only their own feed bills but the feed bills for the entire flock.

The hens should not be fed like the pullets. They should be fed in such a way that egg production will not be stimulated, nor the hens themselves take on too much fat. What would keep the pullets in prime laying condition would make the hens overfat.

All should be made to *work* for their daily bread, but the hens should be made to work the harder, thus keeping down the surplus fat and giving exercise and consequent vigor. About midwinter these hens which have been scratching around in deep litter will begin to lay. By and by one or more will want to sit, and if it is deemed advisable to set them, some early, robust chicks will be the result. If hens for laying are scarce it may be best to break her up and let her go to laying again.

Clean up the incubator and set it at work. A safe and effective way to do this is to set a basin containing a half cupful of powdered sulphur on a flat stone or brick, and after lighting it close it up tightly and let the fumes do the work. Animal life, disease germs, mold, etc., vanish as if by magic, and after airing it well it is ready for the heating. The lamp should be newly filled, rewicked and rubbed bright as a new dollar, the sand trays newly filled and the lamp lighted.

The machine should run twenty-four hours to get thoroughly heated before it is intrusted with the precious eggs. Sometimes a slight change must be made with the regulator before the desired heat is attained. If there has been any disease in the flock of hens or any infection in the incubator, the eggs should be disinfected by dipping in a safe solution of cresol or other disinfectant.

By the third day, or the second, the eggs must be turned and their positions changed about as much as possible, so as to insure an equal distribution of heat. An easy and rapid as well as effectual way is to remove a dozen or more eggs from the tray, placing them in a shoe box or basket. Now roll the eggs in the tray gently toward the vacant spot in the tray. This spot should always be the farther end from the operator. Next separate the eggs in the middle of the tray and roll part of the eggs back to the end toward the operator.

After rolling the displaced eggs about a little, return them to the center of the tray. As the tray is turned about each time it is taken out—once each day—this insures the eggs having all been turned over, and, in time, all changed in position. Some eggs must necessarily be slightly cooler than the others, and by changing those from the ends to the center it prevents some from occupying a cool position all the time.

We are striving to imitate the natural hen. In her nest those eggs on the outside must be somewhat cooler than those directly under her breast. Have you ever seen a hen remedy this defect? Have you noted how she rolls and tumbles the eggs about with her feet and bill? She knows what they need. They need to be turned, and they need their positions changed.

In the matter of moisture we can imitate her also. In early spring, when the air is chill and moisture-laden, if given her choice, she selects a dry, warm, cozy nest and sits pretty closely. Later in the season she will make her nest on the ground, under some shrub or in some fence corner.

We may learn from her that early in the season much moisture is not necessary, also if the location or the season is particularly humid there will be little need to apply moisture. On the other hand, if the location is elevated or the season hot and dry, moisture will be very necessary. This is especially true where the machine is heated by warm air. If by hot water, less need of moisture.

Sometimes a two-tray incubator will vary in temperature a degree or more in the two compartments. This may be remedied by partially covering the cool side with a piece of clean old flannel, or a folded newspaper placed where most needed will help the cause. It is well to bear in mind that the machine can not think, and there must be brain power somewhere to insure success. Move moisture in the sand tray to the side inclined to run high, this will assist in bringing the temperature down to normal.

If one chances to find the heat running too high, one must not lose one's head, throw open the machine and leave it to cool off while going about some other task. A neighbor may come in—a dozen things may happen to cause one to forget, and considerable loss may result. Stay right by it until it is safely closed. Tend it every morning about the same time, and let only one member of the family take this task in hand. Remember the old adage, "What is everybody's business is nobody's business." When the chicks begin to hatch let the machine severely alone. Better one or two telescoped than dozens dried in the shell. Don't let them cook. Keep the lamp very low, or blow it entirely out if the weather is warm and the animal heat rises beyond control.

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ARTIFICAL HATCHING METHODS.

By PROF. H. A. BITTENBENDER, in *Orange Judd Farmer.*

The question is often raised: Which is the better, the hen or the incubator, for hatching chicks? Of course, no machine has ever been manufactured that is quite as efficient as nature herself. However, we have found that we can regulate and govern machines, while we can not nature. The value of an incubator comes in this way, that we can hatch the chicks whenever we wish, while if we depend upon the hen we have to wait until she becomes broody.

Pullets that make winter layers are a valuable asset to the poultryman. In order to have excellent winter layers it is necessary that the pullets be hatched early, so they will begin laying before cold weather. It is also a good plan to have as many hatched at one time as possible, because experience shows that if the flocks are nearer the same age they can be taken care of easier and make more economical growth.

If one is to obtain the best success from an incubator several things must be taken into consideration. It is best that the incubator be one of the standard makes, and, if possible, the kind of machine that is operating successfully in the neighborhood. Each incubator has its own peculiarities, and it is desirable that the operator should thoroughly know his machine. Really, no rigid and steadfast rules can be laid down, but there are a few suggestions that if followed out carefully will give a larger hatch, more vigorous and sturdy chicks.

THE MAN AND THE PLACE.

One person and one person only should be held responsible for the running of the incubator. If more than one tries to care for the machine, neither can be absolutely certain as to what the other has done. A machine can only be regulated intelligently when one knows when and how much the damper was raised or lowered the last time.

An incubator can be operated more successfully in a room where the temperature is fairly constant. A living room could hardly be called a suitable place to operate an incubator. Perhaps the best place is the cellar; if damp, so much the better. However, precautions should be taken that the sun does not shine on the incubator, or the heat from the furnace interfere with the temperature of the room. Fumes of any kind are especially harmful to the success of the hatch. The room should be ventilated, but drafts should not be allowed to blow over the incubator so as to reduce the temperature.

CARE OF MACHINE.

The third suggestion is to set the machine so that it is level. This may be accomplished by the use of a common spirit level and some small blocks placed under the legs of the machine. If the machine is not level the heat will rise to the highest side and leave the lower side colder. Thoroughly drench the inside of the machine with a good disinfectant, such as sheep dip. The further precaution may be taken of washing the eggs with 92 per cent alcohol; the washing to consist of wiping off the egg with a damp cloth.

Fourth, use nothing but the best grade of oil. Many poor hatches have been caused by low-grade oil. The heater is smoked up and the flues choked. It costs a trifle more, but is economy in the end. An even temperature is obtained with much less smoke and soot.

Before lighting the lamp it should be seen that the wick is of sufficient length to prevent its becoming too short and the lamp go out toward the end of the hatch. Often two wicks are sewed together and all danger of short wicks is avoided. If a machine has been run before, never refill until fresh oil and fresh wicks have been supplied. If the corners of the wick are trimmed a little it will aid in keeping flickers from running up. The lamp should be started clean and kept in this condition throughout the hatch.

REGULATION OF THE DAMPERS.

In starting the lamp, begin with a moderate flame. The tendency is for the flame to run up after starting. Then turn the thumb screw on the connecting rod of the regulator until it has one-fourth inch play. A visit should be made every two hours until the desired temperature of 102 degrees is maintained. The machine is likely to run above 110 when first started, and if the regular termometer is used it will be broken, because it registers only 110. An ordinary thermometer for the first few hours, until there is no danger of the temperature running above 110, will guard against this difficulty.

If the temperature runs low and the damper has been raised, loosen the thumb screw again and let the damper down as before. About one-fourth inch play should be given to the damper. Note the temperature the third time, and if around 92 or 93 it is best to be a little cautious. Leave the regulator alone, but increase the flame. If the disc damper is still up, it may be lowered to one-eighth inch play.

This process should be repeated until the thermometer registers uniformly at 102. The place for the thermometer is such that the bulb rests even with the top of the eggs, and the disc has one-fourth inch play about the heater. If the machine can maintain 102 for twelve hours it is safe to fill. After the machine has been filled do not open for two days. In the morning care for the lamp, filling it with oil, but be careful not to spill any oil. If some is spilled see that every trace of it is wiped up. See that the charred part of the wick is scraped or cut off.

CARE OF THE EGGS.

After the eggs have been in the machine for forty-eight hours take them out and see that every one is carefully turned It is not necessary to turn the eggs entirely over. The easiest and quickest way is to shuffle them over with a rubbing motion of the hands as they lie in the tray. A hen turns the eggs as many as five times a day. We should turn them at least three times—morning, noon and night It has been found a good plan to turn the pans end for end. If for any reason one part of the machine is cooler than the other, an evener hatch is secured in this way.

On the third day commence to cool the eggs. When the tray is removed from the machine place it flat upon the table, so the eggs have the same amount of surface exposed. As soon as the eggs begin to feel cool when pressed against the eyeball or the lips it is time to replace them in the machine. At first they will cool rather quickly, but toward the latter part of the hatch much slower.

If at any time the temperature happens to run up high, the hatch can often be saved by thoroughly cooling down the eggs. Never handle the eggs if there is any trace of kerosene on the fingers, as it is sure to injure the hatch. If the temperature runs off it can be adjusted more satisfactorily if the machine is not opened until the regulator has been adjusted.

After the first week the temperature should be increased to 103 and kept at this point until the eggs begin to pip. After that time the temperature should run between 103½ and 104. When the eggs begin to pip do not allow the machine to be opened until the hatch is well over. Then remove the trays and shells and unhatched eggs.

CARE OF THE NEWLY HATCHED CHICKS.

The chicks are better off if allowed to remain in the machine for forty-eight hours without any food. The large yolk material will be more completely absorbed, thus giving the chick a better start than if they are removed. The temperature must be watched very closely during the last few days. The numerous little fellows give off considerable heat, and the temperature is very likely to run up. Temperature over 103 is very detrimental to the health of the young chick.

One factor which has not been mentioned yet, and is by all means very important, is moisture. If the place is dry the floor may be liberally sprinkled daily. A pan of sand saturated with water may be placed in the machine. If the machine is in the cellar and the room is damp the moisture question will often care for itself. The question of moisture must be left largely to the operator, and gauged by the air cell in the large end of the egg.

Often we find that though the eggs begin to pip and hatch, for some unknown reason they stop hatching, and the pipped ones do not hatch. In a case of this kind, if a woolen blanket is wrung out of hot water and thrown over the eggs the chicks will come out in good shape. Where sufficient moisture is kept in the incubator the chicks are more sturdy, stronger, and a larger per cent live than when moisture is deficient.

Food is ground in the gizzard of the hen. The muscles in the walls are strong and work in a rotary manner. This churning will grind grain, provided there is some kind of sharp grit intermingled with it. The lack of grit greatly impairs the digestive capacity of the hen. Round, smooth stones are not sufficient. When the grit becomes round is passes off with the droppings. Oyster shell or limestone will not take the place of grit. Experiments have been tried at Cornell University with grit, and it was found that hens deprived of grit retained in their gizzards for twelve months the grit which they possessed before going into the experiment.—*A. G. Philips.*

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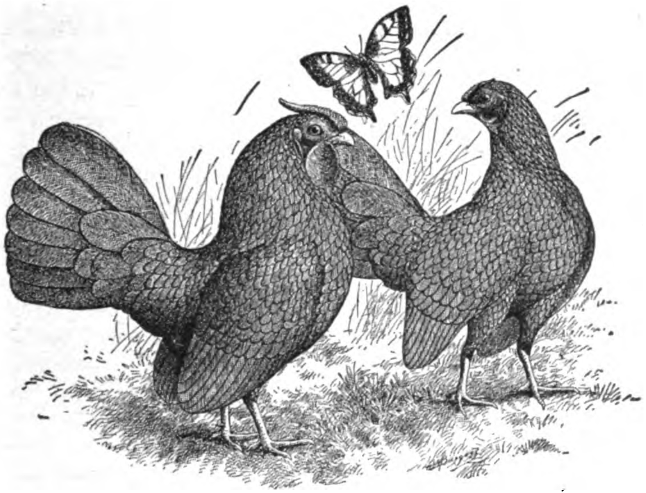

A pair of Golden Sebright Bantams.

RULES FOR SUCCESSFUL INCUBATION.

By D. E. HALE, in *Reliable Poultry Journal.*

Better hatches may be had with nearly all makes of incubators by observing the following simple rules in addition to the manufacturer's directions:

1. Cleanse and disinfect the incubator before each hatch is started. For this purpose use a solution made of one gill of creolin mixed with eight and one-half quarts of water (carbonol, napcreol, sulpho-napthol or zenoleum may be substituted for veterinary creolin if desired, as the composition of these is much the same). With this solution wash the entire egg chamber, nursery and egg trays. If cloth is wet with the solution it should be scalded and well rinsed.

2. Never crowd the egg tray; put in only as many eggs as it will hold comfortably. Set only well-formed, medium-sized eggs. Eggs must be clean when placed in the incubator. If dirty, wash with disinfectant solution named in rule 1, drain and place in machine while still moist with the solution. Don't allow cloth on bottom of tray to become saturated with disinfectant. If it does get in that condition, scald and rinse it well. Careful attention to these two rules prevents white diarrhea.

3. Begin turning the eggs after they have been in the machine twenty-four hours. It prevents the germ from sticking to the shell.

4. In a cold room turn the eggs regularly twice a day. In a room above 60 degrees F. the eggs should be turned three times a day at regular hours.

5. Always turn the eggs by hand. Remove those in the center of the tray, roll balance of eggs gently toward the center, and place eggs that

were removed in the empty spaces left at edges of tray. Do not hurry. Be gentle in handling eggs.

6. When turning as advised in rules 4 and 5, no cooling or airing is necessary if the room temperature is below 70 degrees F., unless the eggs have been overheated. If the temperature of the egg chamber runs up to 105 degrees for a short time, cool the eggs in the tray outside of the machine, in a room at about 60 degrees or above, for ten or fifteen minutes, or until a thermometer resting on fertile eggs registers 90 degrees.

7. When operating in a warm room, eggs usually get sufficient cooling while being turned during the first week. During the second week cool or air from five to ten minutes at last night turning, according to the warmth of the operating room. During the third week cool from ten to fifteen minutes at last night turning, according to room temperature. Stop turning and close machine for hatching as soon as the eggs show signs of pipping.

8. If egg chamber temperature is too low—below 101 degrees—at turning time, do not turn the eggs. Find out what is wrong and correct it. Wait until the temperature is right before turning. Do not turn or cool eggs on testing day except during the test. They get all the airing and handling that they should have while being tested.

9. Do not place the eggs directly on the wire bottom of the egg tray. Nature never intended eggs to hatch on wire netting with a big, cool air space beneath them. Provide a piece of coarse-weave muslin or coarse-weave (open mesh) canton flannel to cover the bottom of egg tray, and place eggs on this soft cloth. Practical men have learned that this means better hatches and fewer chicks dead in the shell. Keep the cloth clean and scald it three or four times during the hatch. In a very dry location keep the cloth moist with boiled water at about 103 degrees, wetting the cloth at turning time from the start of the hatch. In a moist location keep the cloth damp after the first week. When machine is closed for hatching make the cloth quite wet with lukewarm water, and also sprinkle the eggs.

10. At hatching time keep chicks confined to egg tray; do not let them drop into the cooler nursery until they are thoroughly dry. If the egg tray is crowded with dry, fluffy chicks it is best to remove some of them to a warm, comfortable brooder. They are better off there than in the incubator. An incubator manufacturer recently told us that he believed that the careless use or abuse of the "deep nursery," now in nearly all modern makes of machines, is responsible for many of the losses or "chick mortality from some mysterious cause." Keep the chicks in the tray until dry. Remember that in natural incubation the hen sits close on wet chicks, and it does them good.

11. Darkness in the egg chamber is desirable at hatching time. Cover the glass door with opaque cloth or paper. This keeps the chicks quiet, prevents trampling and injury through efforts to crowd toward the light. Baby chicks require rest, warmth and quiet more than anything else (next to fresh air to breathe) for the first twenty-four hours.

12. If the chicks in the incubator pant and "blow," with mouths open and wings spread, it is not because they are too warm but because they

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need more fresh air. When the chicks begin panting and "blowing" you will get a lot of "lungers" in that brood unless you supply more fresh air in the machine or remove the chicks to a brooder. Get the ventilators, especially the top and side ones, open. Open the door the width of a match and keep it so if this is necessary to make the chicks comfortable. The embryo chick within the egg, breathing through the network of blood vessels lining the eggshell, can get along with very little ventilation, and it is believed that it is really benefited by a fairly large amount of carbon dioxide. Things change when the chick is ready to use its lungs at their full capacity. With the first peep it needs more fresh air, but while it is still wet it needs warmth most of all, and the moisture makes breathing "heavy" air less difficult. As soon as dry it must have more and more fresh air, and carbon dioxide becomes positively dangerous and injurious. You will always find the dry hen-hatched chick near the edge of the nest, often with its head peeping out through the feathers, where the best air is plentiful and the warmth sufficient for comfort. Nature knows her business—we should not forget that.

THE LACK OF MOISTURE.

Next to lack of vitality in the breeding stock, it is our opinion that lack of moisture causes more chicks to die in the shell than any other thing. Opening the machine at hatching time to see how many have hatched, or to help some struggler out of the shell, results in increased circulation of air, which dries the lining of the shell on the chick so that it can not move, and many of them are killed from suffocation.

If moisture is applied as directed in the rules given above, or the eggs are dipped in water heated to 101 degrees, many a chick would get out of the shell that does not otherwise.

During the hatching season we receive many letters that merely ask, "Why do my chicks die in the shell?" It is impossible to give a satisfactory answer unless we know the conditions that surround the machine and how it was operated. Many operators fail to write that they have changed the regulator, that the lamp smoked or went out, that the temperature ran up to 110 degrees, that they forgot to cool the eggs for a day or two, that they hammered near the machine, or jarred the machine severely, or any one of a dozen things that would contribute to their failure.

We repeat, you must study you local conditions and adapt the instructions of the manufacturer of the incubator to your own case, then if the machine is a good one and the eggs are strongly fertile, you can not fail to have successful hatches.

Isn't the reason you are not getting more eggs because you have too many hens and chickens; so many that you do not know which are layers and which are not? Pick out just one-third of them; the less sprightly and improperly moulting ones, and pen them up. Go through them and see that they are all healthy, feed them heavy for about ten days, and market them. You will get as many eggs, your flock will look better. they will take less care, they will cost you less to keep them. In other words, they will pay you better.—*Poultry Culture.*

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LOCATING THE INCUBATOR.

By F. W. KAZMEIER, in *The Ohio Farmer.*

After having purchased an incubator, the first question that confronts the novice is where to place it. Most incubator manufacturers advise one to place it in a well-ventilated cellar. The cellar is the best place if conditions are right, one reason being that the temperature does not vary so much as in a room above ground. The great trouble is that not one cellar in a hundred is ventilated enough to permit the successful operation of an incubator.

Remember, in incubation you are trying to put life into a lot of developing germs; and the one great essential for producing life and continuing it is oxygen and plenty of it. Oxygen can be supplied only by furnishing plenty of pure, fresh air. If the place where the machine is operated is poorly ventilated the air surrounding it is deficient in oxygen, and of course it will be impossible for the machine to furnish that life-producing element—oxygen—to the eggs. The result will be many partly developed and dead chicks in the shell at hatching time.

It is even believed by some poultry experts that the heavy mortality for the first ten days after hatching can be directly traced to insufficient oxygen during the time of incubation. The greatest essential in successful incubation is to surround the machine with plenty of pure, fresh air. Most modern machines are so constructed that if a supply of fresh air is available they will admit it automatically. Life is a constant struggle for oxygen, and no animal can live without it.

I hope I have said enough about oxygen and its function in incubation to set you to thinking. To my mind, this is one of the most important factors in successful incubation, and must not be overlooked. Remember, the cheapest and best way of furnishing oxygen is by supplying an abundance of fresh air.

The best way of supplying an abundance to a common house cellar is by opening the windows, and if for any reason you find it necessary to close them, use a muslin-covered frame in place of the glass sash. In some cellars there are not nearly enough windows, and in cases of this kind either do not operate an incubator or remedy the fault by tearing out part of the wall and putting in muslin-covered frames.

The incubator cellar should be entirely free of drafts; that is, on the level of the machine. The change of air which is necessary should occur above the machine. This can be done by hinging the windows on the lower side, so they will swing in at the top. The sides should be boarded up to about one foot from the top. In this way the direct outside currents will be carried up to the ceiling, where you want them.

Guard against direct sunlight falling on the incubator, as that will heat it up unevenly, causing a very uneven hatch, which generally turns out to be a poor one.

A slightly damp cellar is to be preferred to a dry one. Fact is, I would prefer a damp cellar to a very dry one. An incubator operated in a damp cellar always produces stronger chicks than a dry cellar. A hot-air furnace and incubator can not be successfully operated together unless the necessary moisture can be supplied artificially. Then, too, both need oxygen, which, as a rule, is always sadly lacking in house cellars.

Decaying fruit and vegetables are bad company for an incubator, if you want it to do good work. A good, clean, humid. well-ventilated and well-lighted house cellar is an ideal place in which to operate your incubator. Of course if you want to raise poultry to any great extent it is advisable to build a cellar especially for the incubators.

THE INCUBATOR ON THE FARM.

By W. R. Gilbert, in *American Poultryman.*

The prejudice against artificial methods of hatching and rearing, which for a long time hampered the development of the poultry industry to quite an appreciable extent, has now been largely set aside, and these means of hatching and rearing have within recent years been adopted by a large number of farmers in this country. It is, in fact, found necessary, when it is desired to rear two or three hundred chickens in a year, to employ the artificial process, owing to the difficulty of procuring enough broody hens at a season when it is desirable to carry on hatching operations, and also on account of the fact that an immense amount of time and labor would be lost in attempting to rear such a number of chickens by natural means.

The reliability and comparative cheapness of modern incubators have, moreover, done much to help on the industry, and it is now generally agreed that the artificial methods are more economical than natural processes, with regard to initial expenditure, upkeep, running expenses, and time and labor of attendance. A small incubator can hatch forty chickens and a single brooder can rear them, and will take as little time and attention from an attendant as a hen with ten or a dozen chickens. A very high order of intelligence is not by any means essential to the successful operation of the hatching and rearing appliances, and the farmer's or laborer's wife, provided she is orderly in her habits and gifted with common sense, can manipulate an incubator or brooder with quite as much success as the fancier who has made a special study of artificial processes.

In many parts of the country farmers have a fear of bringing an incubator or brooder into the place lest it may set fire to the premises, but this feeling is gradually wearing off, as it is found that the machines are safe and that fires seldom if ever have originated from the incubators or brooders. There certainly is some risk if a cheap and flimsy machine is used, but the appliances sent out by a reliable firm are practically fireproof, and I can not recall a single instance of a fire having originated from either incubator or rearer, except where there was admittedly culpable neglect on the part of the operator.

The manipulation of an incubator is an art to be learned partly from the textbook and articles which are published on the subject and partly

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from experience. Perhaps the following hints will prove helpful, especially to those who are struggling through their first season with artificial hatching and rearing:

Testing the eggs is quite an important matter. When to test them depends on the color and density of the shell. Duck's eggs, having white shells, are the most easily tested, and the white-shelled hens' eggs are also fairly transparent, so that they can be tested on the fourth or fifth day. On the other hand, brown-shelled eggs must be left without testing until the seventh day, and even then, if the shells are thick, a powerful tester must be used. Any eggs which are seen to be infertile should be removed from the trays after the first test, as they are liable to absorb heat from the eggs containing living germs, and to increase the difficulty of keeping the heat in the egg chamber regular. The second test may be made on the tenth or eleventh day, for the purpose of discovering any eggs in which the germs have died since the eggs were last tested. At the first test the fertile eggs containing living germs are those which contain a dark spot, with minute blood vessels radiating in all directions and resembling a spider. The infertile eggs are those which are perfectly clear and look like a newly laid egg, and if any eggs are observed in which there is a dark spot surrounded by a red circle, these are fertile eggs in which the germ has died, and they may be thrown out of the machine.

The causes of germs dying at this early stage are manifold, and it may be that the eggs were stale, or that the birds which produced them were lacking in health and vitality, or that they were roughly handled before being set to hatch, or that the heat was not maintained at the specified point. In fact, the causes of embryo chicks dying within the first few days are very many and frequently unexplainable. Eggs which are plainly infertile suffer little or nothing from their time in the incubator and ought not to be thrown away, as they are perfectly good for cooking, but most people prefer to feed them to the chicks, and they may be held over for this purpose until the conclusion of the hatch. Eggs are tested by holding them, one at a time, between the eye and a strong light, but a testing apparatus is sold by most dealers in poultry supplies, and it is advisable to procure one, as it makes testing easier and surer than to use the hand alone.

Eggs must be turned and cooled twice a day, morning and evening, and it is well to set aside a regular time for this work and for the trimming and filling of the lamps. It is not essential that the day should be exactly divided into two equal parts and that the turning should be done at, say, six in the morning and again at six in the evening, as the purpose will be served equally well if there is nine or ten hours between the first and second turnings and fourteen or fifteen hours between the second and third. The only requirement is to turn the eggs twice a day, with a considerable interval between the times of turning. It is advisable to take the egg drawer bodily from the machine and set it on an adjacent stand or table to cool and turn the eggs. Before the lamps are attended to and while the hands are clean and free from oil, the eggs should be slowly and carefully turned, without knocking them together or jarring them against the sides of the drawer.

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The drawer may then be left out for a period of ten or twenty minutes, or even longer, in accordance with the temperature of the room. In the meantime the lamps may be refilled with oil and the wicks may be trimmed and relighted at once, so that the operator may see if they are burning steadily before he or she leaves the room. The eggs need not be turned during the last two days of the hatch, and it is then advisable to keep the drawer closed, ample ventilation being, of course, provided for. As a general thing, the chicks leave the shells of their own accord, and are removed, when dry, to the brooder, care being taken that they do not get chilled in the course of removal. A good incubator, hatching good hatchable eggs, should bring forth all the chicks by the end of the twenty-first day, but there are defective machines in use in which it is impossible to keep the heat regular between 102 and 104 degrees, and these are also irregular in their results, and may bring out the chicks before the twentieth day or after the twenty-second. In this way much annoyance is caused, and it is advisable to take an early opportunity of procuring a more reliable machine.

E. R. Smith says, in *Successful Farming:*

It has been demonstrated time and again that chickens hatched in an incubator are stronger, grow faster, and, taking the season through, the incubator will hatch a larger per cent of the fertile eggs than the hens. The incubator has several advantages over the hen. Lice will never trouble it; it never changes its mind about sitting and never leaves the nest; it never steps on the eggs, to break some and besmear the remainder so they will not hatch. It has another great advantage over the hen, and that is, it is always ready to set. If you desire to market broilers and roasters in the early spring when the prices are high, you must have an incubator, as you can not find the broody hens at this season of the year.

EXPENSE OF INCUBATOR.

In regard to the expense of a good incubator and three good brooders, they ought to pay for themselves the first year. We will say you wish to raise 150 chicks at this time of the year. If you had broody hens, which you have n't, they would sit on thirteen eggs, and we will say hatch 9, and probably raise 6 to broiler size. This would take 25 hens to raise 150 chicks. You must not think these figures low, for sitting hens in February is a different proposition than in June.

On the other hand, any good incubator will hatch 75 per cent of the fertile eggs. As we assumed the eggs put under the hens were all fertile, we will assume the same for the incubator. A 240-egg incubator would hatch you 180, and surely 150 could be raised. The incubator is ready for another hatch, and may be used for five or six hatches in a season. The only extra expense is for the kerosene used by the incubator and brooders, but this is a small item, while to offset it you must have insect powder for the sitting hens and the chicks. These hens have been an expense for feed and care, and you have also lost their egg production, which is quite an item with eggs around 35 cents a dozen. We can not produce a machine that will make eggs; the hens have a monopoly on that part of the business; but we can keep them everlastingly at it, and hatch the eggs in an incubator and raise the chicks in a brooder. To set hens is like killing the goose that laid the golden egg.

The incubator will not take more than ten minutes of your time each day, while you will admit that 25 broody hens properly looked after would take much more than that.

The incubator has a regulator which takes care of the variation in the temperature, while on the hen we have no regulator—she sits when she takes the notion and leaves when she may change her mind. Of course you can fasten the hen so she can not leave the nest, but then she can sit "standing up," besides she stands a good chance of breaking the eggs.

Many farmers are averse to the using of incubators, just as they looked with criticising eyes upon the self-binder, hay loader, gasoline engine and manure spreader, but these up-to-date tools are bound to come, and the best thing to do is to get in line and get the extra profit by using these labor-saving devices. Without these tools where would the farmer be to-day with the labor question where it is. The incubator is gradually taking the place of hens to hatch chickens, and when one is installed it generally sells others in the neighborhood, if it is a good one.

BUYING THE INCUBATOR.

In selecting an incubator buy one of some firm that has a reputation behind it; jobbers who handle one machine this year and some other next year are not satisfactory people to deal with. I have been interested in the artificial hatching of eggs for the last ten years, and there are many incubator companies which have advertised continually during these years and have received increasing volumes of business to warrant them in building larger factories and installing more up-to-date labor-saving machinery. These facts alone go to prove that their machines are right. When you buy a machine pay a good fair price; remember in this world we generally get what we pay for. If you pay a good price for an incubator you will probably get one that will be a source of pleasure to you, as well as profit; while on the other hand, if you buy the cheapest one you see advertised it may do good work for a hatch or two, then play out, while the higher-priced machine would give you good, satisfactory hatches for years. I have in mind a 260-egg machine that has been used for from four to six hatches for the past eight years and is good yet. We generally get value received for what we buy; the best is always the cheapest in the end.

I think the main objection many farmers have to an incubator is that they seem to think there is some mystery connected with it, but if they will just investigate a little they will see it is copying nature, only on a larger scale.

OPERATING MACHINES.

Running or operating an incubator is not the bugbear some people would have us think; it does not take an expert to run it, and we will be well repaid for the time and attention we give it.

The question is often asked, Which is the best place to put an incubator? A good dry cellar with plenty of ventilation and no draughts

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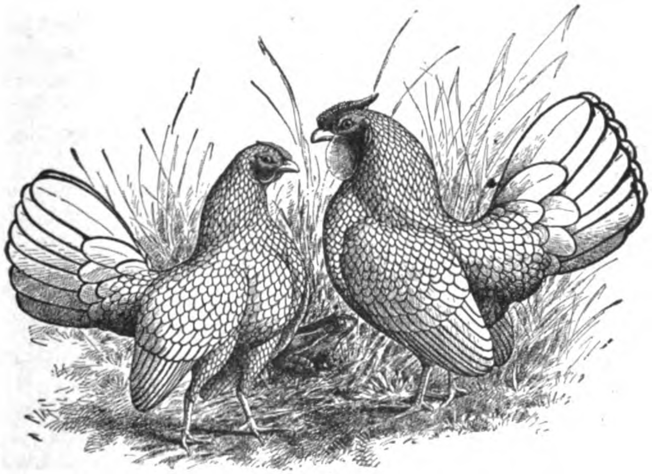
is probably the best location available on most farms. It may be put in an unused room where the temperature does not vary to any extent; a room on the north side of the house is the best, as the sun would not change the temperature.

One of the first requisites for a good hatch, whether you use hens or incubators, is fertile eggs. Eggs from vigorous, healthy stock are more apt to be fertile than those from fat, lazy, lousy hens. Poor stock produces poor eggs, poor eggs poor hatches, and out of the poor hatches very few are raised to maturity. Hens that are compelled to roost in trees or on fences or in a poor henhouse will not lay many eggs during the early months of the year, and very few of these will be fertile. It is like making a cow live outdoors in winter on straw and frozen cornstalks, and expect her to give milk that will test a high percentage of butter fat.

A poor henhouse where the wind can blow through, and snow is driven in, and it gets so cold that the combs freeze, is worse than none. You think you have something when you have n't. It will not take a very large basket to carry the eggs from this house in winter. A great many do not give the incubator a fair test with the hens. For instance, you would pick out the best-shaped and shelled eggs and place them under hens, and then shove any old egg in the incubator, and then blow how much larger per cent the hens hatched than the incubator. An incubator will not hatch any egg that a hen would not. The incubator is just a step higher and on a larger scale. Send for a few incubator catologues, buy a machine, follow the directions, and make more money out of your poultry.



A pair of Silver Sebright Bantams.

INCUBATOR HATCHING.

From *Independent Farmer.*

This is a subject of great importance, and many gallons of ink have been spattered in advising folks as to the best way, the surest way and the cheapest way. Many stick to the old natural method in hatching and raising, while a majority of those having large farms, needing thousands of head to renew the old stock, have embraced the incubator and brooder as a necessity. Both systems have their faults and good points, and if we combine the good points of either by reducing their drawbacks, we are certain to reach the very height of success. Labor is always expensive and often unreliable, hence we must reduce it to its very lowest point of necessity by setting all eggs in an incubator, testing them out when incubated on from six to eight days, depending on our experience and the color of the shell, and to give them to hens which have been doing time on china nest eggs till then. Every step we take in caring for the eggs while in the incubator should be guided by our desire to get strong, healthy chicks. Trays that have no slats to divide the rows of eggs hold most eggs, and as we are compelled to turn them individually by hand two or more times daily, shifting their relative positions from center to edge and *vice versa*, we unconsciously add to the chances of the germs by airing them judiciously. Fresh air is an absolute necessity to the live germ, and it is far better to kill weak germs while under incubation by airing them to excess, than to produce a lot of weaklings, which as chicks are constantly crying for the old hen to sit down, or who when in the brooder persist in rubbing their backs against the source of heat. Such chicks are not worth the oil and feed that keeps them alive. They are money wasters and patience spoilers, and often bring disaster to their kind master who keeps them a-going, by infecting the entire flock with white diarrhea or the "growing-light" sickness.

In hatching as well as in rearing, the law must be borne in mind, that the smallest incubator and the smallest flock, all other conditions being equal, is apt to produce the best chickens in largest number and to grow into healthy birds. As the struggle for existence in a flock of twenty-five chicks is but one-half of the struggle to each one of its members as in a flock of fifty, it is but natural that the first will do better. For the same reason, a hen gives the best chances of success, especially as we save the otherwise constant care of motherless chicks in a brooder.

We reduce the time that eggs are in incubators and gain through having less germs die in the shell; we gain in the hen's time and make her more productive, because she has all fertile eggs, save her flock's strength, and as hens are satisfied with having hatched a cluster, their chicks may be doubled up during the warmer season, and one of the hens, the least likely one, returned to the henhouse for work.

To save in work with the hens while incubating or having chicks, we

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use a common-sense method of our own, which confines all hens, allows them to sit in a natural way, and still prevents serious doubling up. We build our hatching nests in rows of twelve, and in buying twelve-foot lumber nothing is wasted. There is no bottom to the nests and the needed depression to hold the eggs is made right in the sod. The back part is a removable board, in order to get at a hen should this be required, and the front is wide open, facing the south. The roof consists of two boards. The small runs in the south are twelve feet long, and two hens have access to each run. The south wire, made in panel form, is removable to enable us to get at the feed and water dishes. The latter are cast-iron pots sunk into the ground to keep the water cool, and the iron that is taken up by the water is a tonic at the same time for the hens. We renew the water and feed once or twice per week. When the chicks are from ten to twelve days old, depending on the weather and the season, we remove them to the growing field, truck patch or to the asparagus beds, where they are essential in keeping the bugs off the young shoots. The old-time, large-sized, A-shaped coop is as good as any new-fangled imitation, and as any one can build them at home out of refuse stuff their cost can not be considered. Here the chicks stay until they become large enough to inflict damage to the crop, when they are weaned and placed in colony houses in the cornfield. As the corn has by this time grown out of their reach, they will find excellent shade and an ideal growing field to hunt over.

In feeding chicks a system should be employed that allows much variety. Constant changing from one method to another is not conducive to success. Remember to feed ample at all times, but always stay short of overfeeding. The man that feeds to excess kills the desire for hunting and scratching for more, and induces his chicks to grow into lazy hens having an impaired vitality. As the fowls in a wild state require seeds, insects, worms and greens, we must aim to give them this mixture at home. As the range gives bugs, worms and greens, we have to furnish an additional amount of seed or grain, and if we add some specially prepared mixtures we have the ideal ration complete.

A laying hen is nearly always a singing hen. She is continually on the alert, has a bright red comb, and a nervous, fussy manner. She is the first off the roost and the last to go to roost at night. She arrives at the feed trough early and stays long, and if she must rustle for her living she gets down to business and rustles like a good one. The sluggish, slow-moving hen with a dainty appetite and a disposition to sit around and let others elbow her away from the good things is the hen that should find her way to the dinner pot, for she is not a prolific layer and never will be. Usually the sluggish hen is a fat one, if she is in good health. If she is in poor health she will be droopy, sad or dim-eyed, and her feathers will be more or less rumpled and lusterless. There is now and then a hen that never lays an egg, from some physical deformity or defect. These never have the same appearance as the steady layers. Often they are masculine in appearance, but perfectly healthy.—*American Poultry Advocate.*

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POINTERS ON INCUBATION AND BROODING.

By W. A. LAMB, in *Successful Poultry Journal.*

In five years' work with nearly all kinds of incubators, I have concluded that it makes very little difference whether the incubator be hot-air or hot-water style, as it is the proper degree of heat and moisture that causes eggs to incubate.

The hot-water machine heats the eggs with hot air radiating from hot-water pipes or tank. Heat radiating from hot-air pipes or tank would give the same results, with the exception that more or less vapor escapes from a hot-water machine into the air surrounding the machine, and the air entering the machine is not so dry as in the case of a hot-air machine. Therefore the hot-air machine will need more applied moisture than the hot-water machine.

Most hot-water machines are so constructed that only enough ventilation to hold the proper amount of carbon dioxide given off by the eggs is allowed. The air under a sitting hen shows about 35 per cent carbon dioxide, and a machine should be so ventilated as not to carry off too much of the carbon dioxide, as it is essential to a successful hatch.

One should not try to operate a machine where the temperature of the room varies 40 to 50 degrees in a day. The temperature of an incubator room should be from 60 to 75 degrees. A cellar is an ideal place to operate an incubator, if it be well ventilated, so that the air entering the incubator be not full of poisonous gases from the lamp.

The correct temperature for an incubator is from 102 the first week to 104 the third week, with the bulb of the thermometer on a level with the top of the eggs. A slight variation from this will not spoil the hatch, but one should endeavor to keep the temperature even.

The moisture question enters largely into a good hatch. Too much moisture will cause the embryo chick to grow too fast, filling up the shell and taking up the air that is stored in the large end of the egg for the use of the chick while it is breaking its way to air and liberty. Too little moisture causes the egg to dry down too fast, making the chick puny, sticky and weak. When the chick pips the shell it is very apt to dry fast to the shell and fail to get out. The only way of being sure of too much or too little moisture is to use a hygrometer or moisture gauge. After an operator becomes familiar with the machine he is using, the hygrometer may be dispensed with, except in very hot and dry weather, when it is best to use one.

The best plan for a beginner in operating a hot-air incubator is to place a pan of water or wet sand in the bottom of the egg chamber at the beginning of the second week, leaving it there until the eggs begin to pip, when it should be removed and replaced with a piece of burlap for the chicks to rest on while drying. In operating a hot-water machine it is seldom necessary to apply moisture except in very dry weather.

The best success has been obtained by turning the eggs twice a day and

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allowing them to air until cool. When eggs cool the shell contracts and allows the air to enter.

No one can successfully incubate eggs from overfat, inbred or rundown stock, or from hens forced for egg production. The stock from which eggs are saved for incubation should be fed plenty of whole grain and have plenty of exercise. You will often hear of a farmer's wife that never before operated an incubator having phenomenal success in hatching, while an operator of experience, using eggs from yarded fowls, has very poor success. This is accounted for by the farmer's flock having free range and having to hustle from morning until night for a living, while the yarded fowls are fed and pampered, having very little exercise. It is possible, however, to care for yarded fowls in such manner as to prevent this result.

We have often heard people say that they could hatch chicks all right, but the trouble was to raise them. This goes to show that more attention has been paid to perfecting incubators than brooders. No brooder is fit to put a chick into unless so arranged that the chick can be perfectly warm and comfortable, or can retreat into cool, fresh air if needful.

A brooder should have two compartments, one warm, the other cool, or should have the heat confined to a hover, so that one part of the brooder is much cooler than the other part.

Having a lamp inclosed in a small box attached to one side of the brooder is dangerous, and requires care on windy nights. A lamp so inclosed will blow out on windy nights if the ventilator be left open, and if the ventilator be closed the lamp burner becomes overheated and the oil gets on fire, or gas forms, causing an explosion. The proper place for a brooder lamp is under the brooder, with plenty of air space around it, just as the proper place for a furnace to heat a dwelling is under the house and not stuck on the outside.

A circular hover is best, as the chicks can come under it from all sides, thus preventing crowding and overheating, as they can also retreat when too warm to the cooler parts of the brooder.

Mrs. Elizabeth Lee has a hen who has done her share for several seasons in supplying the family table with eggs and fries. That hen, on deciding a few weeks ago to rear a family, selected as the groundwork of her nest a two-gallon tin can. On top of that and fourteen eggs she patiently sat and meditated upon maternity for two weeks, with a fidelity that seemed to indicate unswerving determination. Then, yielding to some strange perversity, she deserted those fourteen perfectly good eggs and forsook the tin can for a discarded felt hat. Luckily, however, Mrs. Lee detected the unhenly abdication, and she tried an experiment. Each night for a week she covered the eggs with a sofa cushion. In daytime she let the sun beam upon them directly. At the end of a week thirteen small but busy chicklets cracked their way out of the shells of those eggs. Mrs. Lee is proud as an incubator engineer, and the old hen is so ashamed that she goes way down the railroad track every day to cackle at herself.—*Minneapolis, Kan., Messenger.*

HATCHING STRONG INCUBATOR CHICKS.

By F. A. TIFFANY, in *Successful Poultry Journal*.

Hatching of strong chicks depends on several important things besides incubation. The breeding stock must have been grown properly and be fully matured when the breeding season approaches. It must be cared for properly and not fed on forcing feeds for increased egg production. Free range has a good effect on fertility of the eggs. If this can not be had, good-sized yards sown with either wheat, oats or rape will produce the desired results.

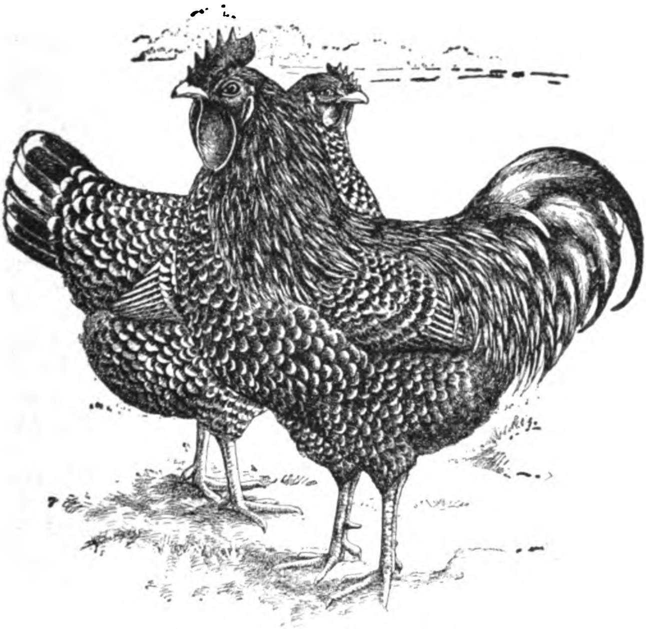
In selecting eggs for hatching, care must be taken in selecting good-shaped eggs, as odd-shaped ones will hatch crippled or weak chicks. Eggs should be kept at a temperature of about 60 degrees and should be turned daily.

A good idea, where incubators are used, is to have a few extra trays, so that when the eggs are gathered the hatching eggs are sorted and placed on the trays daily, and when a machine is empty the trays are ready to be placed in them. This saves extra handling of the eggs, which is detrimental.

The incubator should be a standard make and should be heated up to a temperature of 102 degrees. When the regulator works and the machine has reached that temperature, the eggs are ready to place in it. Care must be taken of the lamp to see that it is properly filled and trimmed.

The eggs are not taken out until the third day, when they are turned every twelve hours and cooled a little more each day until the eighteenth day, when the machine is closed until the chicks are hatched. The temperature of 102 degrees will increase itself at the end of ten days to 103 degrees by the germ developing, and by the sixteenth day will rise a degree more. It should then be reduced to 103, except on the twentieth day if it rises to 104½ it will do no harm, as the animal heat causes the rise in temperature. On the twentieth day care must be exercised to see that enough moisture is entering the egg chamber to keep the little fellows from sticking in the shell. A good way to add moisture is to pour hot water on the incubator-cellar floor, or to set a bucket full of hot water under the lamp until you notice little beads of sweat on the inside of the glass of the incubator door. Under no consideration should the incubator door be opened until the hatch is nearly completed, as every time you try to assist one chick you injure a dozen others. The important thing is tempering or hardening the chicks, as they will have to be dropped down gradually from between 103 and 105 to 90 degrees, the latter heat being right for brooding at the start. A good way is to have a thermometer in the nursery of your incubator and open the door slightly until you have gradually lowered the temperature to 90 degrees. The chicks should be at least thirty-six hours in the incubator before being taken to the brooders.

On removing chicks from the incubator they must not be exposed to drafts or chilled, as this will upset all previous good care, as a chilled chick will soon droop and die. Thousands of chicks die from no other cause than faulty handling from incubators to brooders. Then, again, chicks hatched in a faulty incubator, no matter how good the breeding stock or how good the care, will be of a kind that no expert could raise; but if good care, good breeding stock, good fertility, good incubator, good judgment are carefully followed and observed, strong, healthy, livable chicks will be the result.



A pair of Mottled Javas.

To-day the White Leghorn is the most popular fowl in America for the production of white-shelled eggs for market.. It is also one of the most popular exhibition fowls. But how long will the popularity of the White Leghorn last, after its utilitarian qualities have been bred out for the sake of show points? The answer should be obvious to all who really study this important question of breed utility. There are other claimants for the white-shelled egg honors knocking at the door of trade for recognition, and they will find an entrance sooner or later. The story of the downfall of the Brahma should prove a lesson to Wyandotte, Plymouth Rock, Rhode Island Red and Leghorn breeders in the future. Fine feathers are all right—we admire them—but "handsome is that handsome does" and the breed that lays is the breed that pays.—*American Poultry World.*

INCUBATOR TROUBLES.

By **Mrs. S. B. Titterington**, in *The Wisconsin Farmer.*

Quite a group of incubator troubles arise from the use of poor oil. A kerosene lamp is always more or less of a doubtful proposition, especially when it is kept burning night and day for weeks at a stretch. In the first place, to avoid many of these related troubles, a high-grade oil should be chosen. The question of safety is an important one. A regular heat can not be obtained from the inferior grades. No oil should be put in an incubator that does not stand the 150-degree fire test. The difficulty lies in knowing what grade one is really buying. All over the country oil which is known to the manufacturers as "tank-wagon oil," testing 120 degrees, is sold as the best quality. Such oil burns fairly well at first, leaving in the lamp a yellowish, low-grade oil, which smokes the chimney and gives off an almost unbearable odor. The 150-degree oil, double refined, water-white, is almost infinitely better. The oil burns clear almost to the last drop, the chimney remains remarkably free from smoke, and very little odor is discernible. This is the safest, most satisfactory article, for the low-grade oil with its smoke and odors vitiates the air for the developing germs within the chamber and lessens the prospect for a good hatch.

Given the best oil, what is still necessary to avoid trouble? The lamps must be not only well cared for, but extra well cared for. Very little cinder will gather on the wick with the proper oil, but whatever is formed must be most carefully removed daily. Since a full lamp gives a better heat than a partially full one, it is better to fill it both night and morning. In lamps that have water jackets, or any appliances for keeping water around the outside of the flame, the water must never be allowed to dry out.

Moisture and ventilation have been the crucial problems ever since the beginning of artificial incubators in the civilized world. In China, where they have had hatching ovens for thousands of years, these little matters do not seem to bother them much. But with us it is very different. These two factors have been a double-headed rock on which many a promising incubator enterprise has split. And while we have learned many things, there is still quite a difference of opinion among incubator manufacturers as to the best way to secure them. However, my experience has led me to believe strongly that we are more apt to use too little moisture than too much, especially toward the end of the hatch. The ventilation is now so well provided for in the best machines, that one may safely follow directions and be reasonably sure of being at least somewhere near the right track.

"But what about turning eggs?" I hear some beginner ask. Some authorities say turn twice a day; others once, while some advocate even less handling.

If we take the old hen as our model, we shall surely turn the eggs twice daily during the first two weeks, and oftener as the close of the hatch approaches. Some call this frequent handling and turning the last week "exercising the eggs," and firmly believe that it helps to strengthen and develop the embryo. I must admit that I have done this of late years, but am not prepared to assert that it is absolutely essential. When the time comes when the animal heat runs high, the hopeful indication we look for, one of the easiest methods of cooling the eggs is to take them from the machine and roll them about. I like the theory that the touch of the human hand is helpful. I do not believe that any method of mechanical turning at any period of the hatch is equal to the gentle touch of the hand.

But the chicks die in the shell! This wail goes up all over the land during the hatching season. Yes, and they sometimes die in the shell under the old hens. It is discouraging to find dozens of fine, well-developed chicks dead within the imprisoning shell. But this is a mystery whose solution we have not yet reached. We have learned that plenty of moisture must be given at hatching time, else the chick dries to the shell and is unable to escape. But this does not explain why so many chicks, seemingly all ready to enter the world, die before the time of exclusion. All we can do is to follow the best light we can get regarding the management of the incubator and the eggs, and accept with sportsmanlike courage the results of faithful efforts.

There is one point that should not be overlooked, since it has to do with modern research and prevention of trouble: White diarrhea in incubator-hatched chicks became so prevalent, and the cause of almost ruinous loss, that our government set its expert bacteriologists to work to discover, if possible, the germ that was the beginning point of the disease. After years of investigation it was discovered that a single bacillus which abounded in the system of the adult fowl was responsible for the great fatality among chicks hatched artificially. Going still further, it was found that these bacilli were often found on the shell of the egg. Fostered by the genial warmth of the incubator, they multiplied amazingly, until at exclusion the unfortunate chick found an army of enemies awaiting it. The result was the terrible white diarrhea. Further investigation and experiment showed that this trouble and loss might be avoided by disinfecting and cleaning the incubator after each hatch, using a strong solution of creolin, the eggs also being washed in a weaker solution. This has checked the disease in a marked degree, and is a most valuable result of skilled and painstaking investigation.

Feeding the flock during the winter months is altogether a different proposition from feeding in the summer, when the fowls have free range and can pick up a great variety of food. During the winter months, especially in parts of the country where the ground is covered with snow a greater portion of the winter months from November to March, every ounce of food that the fowls get must be supplied by the owner. When on the range in the summer time they pick up a great portion of their food. So during the winter months we must supply the equivalent. It is necessary that the fowls have some form of animal food. Feed about an ounce a day to each bird.—*Mrs. B. F. Wilcoxon.*

RAISING EARLY CHICKS.

By MRS. MILLIE HONAKER, in *The Wisconsin Agriculturist.*

Whether or not it will pay to raise early chicks depends on how successfully it may be done. By "early chicks" is meant chicks brought off ahead of the ordinary crop, while winter conditions still prevail. There is money in such chicks, both to sell and to keep, where they may be raised, but they cause more work and are more difficult to raise than later ones. It is not so difficult, however, as most people suppose.

The main things are an incubator, a good brooder and some kind of a room or small building which may be used for a brooder house. Any incubator which will work well in warm weather will work well in cold if given a proper location. The same can not be said of brooders. Comparatively few of those throughout the country are fit for cold-weather use. What is wanted is a roomy, well-built brooder with a heating apparatus that can be depended on to keep it warm regardless of weather conditions. The brooder house should be conveniently located and warm enough to afford adequate protection. With these there is no reason why February chicks can not be as successfully raised as April or May chicks.

Eggs for early hatching should be planned for ahead. If they are to be fertile and strong in vitality, hens will need intelligent care and feeding. Both animal and green food must be supplied in abundance and the hens kept active and healthy. Oats and other small grains should constitute a large part of the grain ration. Superfluous males should be removed and inbreeding avoided. Eggs for early hatching should be gathered often and kept where they will not chill; nor should they be kept in a warm place. All thin-shelled and doubtful eggs should be left out.

The cellar is the best place for the incubator in cold weather. Sudden changes of weather will not affect it here, and the temperature can be maintained at a more even point than anywhere else. Next to this is a tight, unwarmed room in some part of the house. A room which is artificially heated and much used is not good. The temperature can not be kept even in such a room, especially at night, and the constant jar is injurious. What is required is a quiet place, free from draughts and not subject to sudden changes of temperature.

Care is necessary in cold weather, in cooling and handling the eggs, not to chill them. If the room is cold a flannel cloth should be thrown over them when they are set out to air. If turned with a rack it is a good plan to turn inside the machine. The object should be to prevent the warm eggs from coming in contact with very cold air for any length of time. The sudden change acts as a shock to the developing chick and weakens it. Very little moisture will need to be supplied in the cellar or cold room, and that not until the last days of incubation.

When the chicks hatch they should be left undisturbed in the incubator for a day or two. This is advisable at any time, but especially so in cold weather. Trays should be removed as soon as all are out, and the chicks left to get strong. If one is ambitious to know how many there are, the shells may be counted.

It is important that the brooder be well warmed up before the chicks are transferred to it. Temperature should be about ninety degrees. It is better to warm up the day before to insure all dampness being dried out and to make sure that everything is working right. It is useless to try to raise a batch of chicks in cold weather without a thermometer. A cloth should be thrown over the chicks while being carried to the brooder, to prevent chilling. It is almost fatal to chicks to chill at this stage.

The temperature of the brooder under the hover should be kept around 90 degrees the first week, gradually lowering to 80 by the end of the second, and from that on down to 70 in a few days more. The lamp should be filled regularly and everything kept in good working order. More than one batch of promising chicks has been lost because the lamp was allowed to burn dry or some other avoidable thing gone wrong.

Chicks should be fed inside the brooder for a number of days. That this may be done, the brooder should have two compartments. Unless the weather is very cold they may be let out about the fifth day, but should be watched closely to see that they all find their way back into the brooder again. As soon as they learn to go back of their own accord they may be given the run of the brooder house during the warmer part of the day. At the end of ten days they may be allowed to run out when they like. About this time, if weather is favorable, they may also be allowed to run outside a little. In a few days more they may be given full liberty, except the worst days. They will not stay out longer than is good for them, and if properly hardened down to it they will stand a considerable amount of cold without injury.

There is no better food for young chicks than prepared chick feeds. These are sufficient of themselves the first few days. All brands or mixtures are about equally good. I prefer one, however, which contains both grit and charcoal. Dry feed is better than wet feed at any time, but especially so for early chicks. After the third or fourth day the infertile eggs tested out may be boiled and one or two fed at a time. A little lean meat, cooked and put through the meat chopper, or a small quantity of freshly cut green bone may be given daily in a few days more, and will promote a very rapid and vigorous growth. To the chick feed may be added coarsely cracked corn meal, wheat, and so on, as the chicks grow and can eat it. Clean water should be kept constantly where chicks can get it.

Unless the weather is very cold, chicks will do better if removed from the brooder at from five to six weeks old. If one has a warm place for them it is better to remove even sooner. It is a mistake to keep them in the brooder too long, even when the weather is quite cold. Care must be taken, however, to see that they do not pile up at night when they are removed.

Chicks should weigh about two pounds at from ten to twelve weeks old. Two-pound chicks the middle of May to the first of June usually bring

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around six dollars per dozen. The cockerels alone will return a handsome profit, leaving the pullets, if desired, for early fall layers; or all can be sold and other pullets, still early enough for good winter layers, be raised in their stead.

THE LANGUAGE OF FOWLS.

By H. H. STODDARD, in *American Poultry Journal.*

Sometimes within the limits of one race of people more than a hundred dialects are spoken. There are instances where, though one blood, the people of one district can understand but imperfectly the speech of another, and in other cases not at all. But fowls understand each other everywhere. Each of a variety of sounds has to them a fixed meaning, which is the same in every quarter of the globe and in all the many breeds of domesticated fowls.

There has been much discussion of the question whether all the races of our tame fowls sprang from the wild *Gallus bankiva.* The language of the birds must be appealed to to settle this point. Darwin, of immortal name and fame, though he bestowed a most amazing amount of study and research on fowls under domestication, and availed himself of the assistance of many eminent naturalists in this work, which was prolonged through many years, overlooked the matter of the common understanding of all our breeds of each other's cries, and also of the speech of the wild *Gallus bankiva,* but not of any other species of *Gallus.* He speaks of qualities of voice, but nowhere alludes to the meaning of the sounds.

Thus, American edition, 1868, "Animals and Plants Under Domestication," volume 1, page 314: "The Cochin, with its deeply furrowed frontal bones, peculiarly shaped occipital foramen, short wing feathers, short tail containing more than fourteen feathers, broad nail to the middle toe, fluffy plumage, rough and dark-colored eggs, and especially from its peculiar voice, is probably the most distinct of all the breeds. If any one of our breeds has descended from some unknown species, distinct from *Gallus bankiva,* it is probably the Cochin, but the rest of the evidence does not favor this view. All the characteristic differences of the Cochin breed are more or less variable, and may be detected in a greater or lesser degree in other breeds. One subbreed is colored closely like *Gallus bankiva.* The feathered legs, often furnished with an additional toe, the wings incapable of flight, the extremely quiet disposition, indicate a long course of domestication; and these fowls come from China, where we know that plants and animals have been tended from a remote period with extraordinary care, and where consequently we might expect to find profoundly modified domestic races."

Following Darwin's suggestion regarding the divergence of the Cochin, or the whole Asiatic family, from the other races, naturalist writers have studied all wild species of *Gallus* in state of nature or in zoölogical collections that resemble, even faintly, our Asiatic breeds. Finding nowhere any species that answers the ancestral requirements sought, some investigators have surmised that the Cochin family descended from a wild *Gallus* species now extinct—a hypothesis which Darwin had also mentioned but rejected as extremely unlikely.

Much discussion could have well been spared, since in all our breeds complete unity of complicated languages can only mean unity of wild ancestry. At one time I spoke to an eminent American scientist, who had met Mr. Darwin several times, of the nonmentioning of this evidence of language by Mr. Darwin, whereupon my listener evinced a very lively interest and urgently advised me to write about it to the great reconstructor of biological science. My American professor said that I would receive a prompt and hearty reply from "the greatest and grandest man who ever lived," to quote his exact words. This I promised to do, but the death of Mr. Darwin, only a few days after, prevented.

Unity of speech is the key to the question of descent. From the strutting Bantam cock, not much larger than a robin, to the ponderous Cochin, the speech is the same, only varied in volume and length of sound, pitch, and quality of tone, and these only depend on the size of the fowl and the amount of air that may be forced through the organs of sound, and in a slight degree probably on the variation in form of head and neck in different breeds.

Ordinarily, people know but few cries of poultry—say half a dozen. Just as concerning wild flowers, the average person knows the names of only a very few, and of wild birds can mention robin, crow, jay, blackbird, bluebird, yellowbird, one or two species of sparrows, and is then up a stump. I pity persons to whom the great out-o'-doors is a sealed book, just as I pity those to whom a fine concert is just simply a noise, and who can no more imagine what it contains than they can imagine heaven.

Nature has given to the denizens of our poultry yards expression, and generations untold have continued to express joy, fear, hate, love of mates, love of young, satisfaction, sense of supremacy, warning of danger, etc., by the same sounds or combinations of sounds.

Not only are there many distinct cries, but by changing power and volume, or by subtle variations of inflection, or rapidity of utterance, the same cry can be made to express several different shades of meaning. For instance, when a hawk is seen at a distance the cry of warning is given in a mild, slow, calm manner, as if to say "there may be danger; he may get you if you don't watch out; but don't be scared yet awhile." But how staccato, earnest and thrilling the alarm when the hawk is close by and evidently means business! It is the same word, but now means, "Run for your lives; each one for himself; hope for us all, and the devil take the hindmost!" Again, oftentimes we hear this note of warning when only a song bird or a pigeon flies over. At first glance the cock fears danger and commences to give his faithful warning, but quickly the mistake is discovered, and "before the words are out of his mouth" he modifies them with an inflection, and every hen understands in an instant that it is a false alarm, no fire, and not one will stir. Is not this talking? At least it is the communication of an idea. "Dan-g-er—Oh, no, I made a mistake; it is only a robin." This is one of the marked instances where a meaning is conveyed merely by an inflection. It is only one of many.

One of the strangest cases of modifying a particular cry, so as to change its meaning and also have some fun—for, mark you, fowls, like dogs and many other animals, do have rudiments of humor or something resembling it—is when a hen flies down from a high place and her shadow darkening the ground takes chanticleer by surprise. He begins the hawk-warning cry quick as lightning, but as suddenly discovers his mistake, and to cover up his blunder and at the same time ridicule the hen for making such obstreperous clatter he turns the cry into a ludicrous whoop, as much as to say, "You make an old Harry of a fus about it!" The flock, instead of running for safety, understand the peculiar whoop and look up as if amused and as if a comic actor had succeeded in entertaining their monotonous lives.

By counting the variations of the same cries which convey different meanings, there are over forty-three distinct terms of language. Some of these are obscure and for a long time elude study. But, mind, the birds understand them all to a nicety without any study. Some cries are being sounded every minute, like cackling and craking in a busy morning of spring, while others are heard but rarely. For instance, when two hens are fighting, the grand Turk of the harem may not take notice, but merely let them have it out. In other cases he crowds between them, but says nothing. In still other cases he scrapes his wings in circles around one of the belligerents, while uttering a peculiar cry. Now, there is another behavior somewhat rare. He does not scrape, neither is he content with standing silently between the fighters, but having separated them he utters a note much resembling the scraping note, but with this difference—the latter has a coaxing expression, the old beau saying, "Come now, you know how much I think of you; come away and don't disgrace yourself." But when he describes no circle, but stands with head high and an air of authority, he employs what is essentially the same cry, but now it is in a commanding way, not a coaxing way, and is addressed to both, not to one, and means plainly, "You just stop this, both of you. A plague on both your houses; I won't have it."

There are some cries which are given by very young chickens only, some by the male bird only, some by the hens only, and still others are common to both sexes and all stages of growth.

YOUNG CHICKENS.

(1) First peep—"Hello! I'm in the world and conscious of the fact."
(2) "I'm sleepy, mother, brood me."
(3) "I'm cold, mother, warm me."
(4) "I'm hungry."
(5) "I'm here, mother, and know where you are."
(6) "I'm lost! Oh! I'm lost, mother! Where are you?"
(7) "How good this is!"

There are several other cries that are common to chicks and grown fowls both, which will be mentioned farther on. The above seven may be described as follows:

(1) This first cry begins before the youngster is really born, and sometimes continues for hours, while the chick's chisel is employed making an opening in the shell, but stops for a little rest or nap for the final

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kick which bursts prison walls. After the little bird is "nest dried" and able to sally out from its mother's feathers, this cry takes on a less urgent character.

(2) But this little skirmishing around is done before a partly petulant and partly coaxing demand is made by the chicks for quiet and sleep. The discerning mother usually quickly shows that she understands its meaning. If, however, she is too ambitious and keeps on scratching, cry No. 3 is heard.

(3) This in cold weather means, "I'm cold," or it may mean, "Mother, I'm tired of running around and tired of teasing you; oh, do brood me."

(4) The hunger cry is so well understood by the hen that, if set up by a considerable number of her charge, she will abandon brooding and scratch like the "old scratch."

(5) This is plainly the regular signal to the mother that all is well and that she need n't worry, and is also a friendly greeting to brood mates.

(6) This is a signal of distress, and differs from other cries of worry made by adult birds in that the attitude of the bird uttering it plainly denotes search. There is evidently a quest for locality accompanied by an attitude of listening for response, and when this comes it is amusing to see how quickly the note changes from anxiety to satisfaction.

(7) When everything is tranquil and the young birds all feel secure and are enjoying a meal, there is a happy chatter of contentment which means "How good this is!" This is very pleasant to listen to if a person likes animals at all.

THE COCK.

(1) Ordinary crowing.
(2) War cry on beginning a fight.
(3) Crowing on winning a battle.
(4) Telling a hen where to lay.
(5) Purring noise when circling and scraping wings.
(6) Welcome to hen who rejoins flock.
(7) Says it's a false hawk alarm.
(8) Mistaking hen for hawk.

(1) Every country child, because of one of the universal first lessons of its mother, can tell what the rooster says, "Cock-a-doo-dle-do." If this is heard in the still night when the fowls are on their perches, it admits of a licensed translation, "Women rule here." Then we hear a response from the next roost, "So they do here," and still farther, at the next farm, an Asiatic sounds forth with his deep bass, "So they do e-v-e-r-y-w-h-e-r-e." Then in the daytime we see the cock perch on the fence, flap his wings and say, "I challenge the world," or "I stand ready to fight." Whatever translation we make, there is conveyed the idea of boasting and supremacy, and it can not be denied that this loud talk has reference to the other sex, in great measure, for when a number of cocks or cockerels are shut up by themselves where they can see or hear nothing but crowers, they crow but little.

(2) Place a strange rooster on the ground twenty or thirty feet from another, and after some preliminary staring, perhaps crowing starts,

which is different from the ordinary cheerful note when daybreak approaches, or the ordinary braggadocio of peaceful days, in that it contains anger and defiance, often mingled with solicitude regarding the results of the impending conflict, degenerating sometimes into fear betrayed by a peculiar hysterical hoarseness.

(3) The crow of rejoicing on winning a battle differs from all other crows, in that it plainly contains something besides boasting. It is more intense and excited than No. 1. It proclaims triumph. The victor claims dominion, he struts, looks about with a defiant air, and then commences making himself agreeable to those of his subjects—the non-combatants—that have been standing around apparently unconcerned while the battle went on. Now he begins to search the ground carefully, and if perchance he spies a worm or a kernel of grain, what a volley of words, "cut-cut-cut-cut-cuttle," as much as to say, "You see here, I am a good provider and self-denying." Then he resorts to flattery; describing the arc of a circle, he lowers his wing as though he would step on his secondaries, and in conciliatory tones says, "Cuttle, cuttle, cuttle, cut, cut, cuttle," which may be translated, "You people who don't crow are very fine, very beautiful, and I stand ready to fight my head off." He mounts the fence, flaps his wings, crows his loudest, which, translated is "Greatest cock in the w-o-r-l-d, and it is all right." He acts as did Julius Cæsar, who, after beating all the known world, claimed a great triumph and started for the gates of Rome with the longest procession, the largest triumphal cars, and the biggest drove of elephants ever known in Italy. Cocks are like kings. Read the history of kings in all ages. It seems to have been a constant struggle to get on the throne, or if once on to keep there.

(4) Reader, did you ever listen to the small talk of Chanticleer when he renders his assistance and gives his advice to Biddy in the selection of a new nest? No one after witnessing this scene will ever maintain that the crower does not have a language which is varied enough in its use and expression to answer the purpose of a truly paternal cock, not only proud and valorous, but amorous and provident.

(5) This is plainly a song of sex, a mating song. It is of the same character as the craking song of the hen.

(6) When a hen flies to meet her regular flock mates after having straggled far away or been detained while laying, the cock welcomes her with a short, impulsive cackle intoned differently from the ordinary cackle, in which all join.

(7) This acknowledgment that he made a false alarm has been described in the first part of this article, where Chanticleer at first glance mistook a flying robin for a hawk.

(8) This is a case of the cock's mistaking one of his own hens for a hawk as she flies down with a great clatter from her nest in the haymow or somewhere, its peculiarity being in the ending, which betrays annoyance at being fooled, mingled with a note ridiculing the hen for making a fuss.

ADULT HENS.

(1) A hen clucking to show she is a sitter.
(2) Ordinary call to chicks.
(3) Loud call when chicks have strayed and are lost.
(4) "Spread out and enjoy yourselves for all is safe."
(5) When nest is disturbed, a loud remonstrance, "Let me alone."
(6) When with a brood and somebody approaches there may be a rather quiet remonstrance, "Don't bother us."
(7) Craking—breeding song.
(8) Cry of pain while laying.
(9) War cry when preparing to defend her brood.
(10) Exclamation when flying or running to join flock mates after separation.
(11) When on the nest, purring to a friendly hen that comes to lay in the same nest.
(12) When brood is attacked, a command to chicks to run in all directions and hide.

(1) After the days of craking and cackling comes the period of clucking. The sitting hen maintains profound silence while brooding her eggs, but when removed, or leaving her nest for food, she utters the sound which indicates her motherly instincts. Why does she cluck before any chickens appear? The cluck is commonly supposed to be merely a call used for the purpose of keeping the chickens from wandering far away, but this is not entirely correct. There is no reason for supposing that the clucking of a hen is at any time merely a senseless noise, with no meaning.

Among fowls, as we have before remarked, and also in the case of many quadrupeds, one sound is used to express different feelings or ideas, either by variation in rapidity of utterance or by nice inflections. The cluck of a sitting hen is never so rapid nor so earnest as when she has a full brood of chickens. Previously to the hatching, as she goes about for her food, she merely says to the other fowls, "I am a sitter." The strong instinct that impels her to sit so patiently tunes her voice to motherly talk; she ruffles her feathers and says to all she meets, "I am set apart for a great work." But when she beholds her brood, a day old and ready to walk, her voice is rapid and earnest, every sound having an import of care and caution: "Take care, take care. Come here now, come nestle under your mother's wing, my darlings." She warns and chides, and how well the chicks obey her.

(2) The ordinary cluck to let chickens know where she is differs from that she employs when in the first flush of maternity, because slower, and there are pauses occasionally for rest.

(3) When a member of the brood strays or gets lost in the tall grass, what a shrill peeping, "I'm lost! Oh, mother, I'm lost!" and how constantly the mother responds until the object of her solicitude is restored.

(4) It is very interesting to notice how, after some intruder has

excited the mother hen and her chicks have run to her for protection, she turns her head when the scare is over and squints in every direction to make sure that everything is all right before she resumes a tranquil form of cluck, instantly understood by the chicks to mean "Danger is over; you may now resume your rambles."

(5) When you meddle with a hen's eggs when she is on her nest, or another hen comes to lay in her nest and she objects, the petulant remonstrating squawk she gives is comical because so shrill and peculiar.

(6) When a mother hen is quite tame and somebody comes to see her brood and she begins to croon softly, it sometimes seems as if she was actually proud of her charge, just as it seems as if a tame mother cat is delighted to show off her young kittens.

(7) The craking of a pullet means that she will soon lay, if not already, and as she grows older she is more vociferous in proclaiming that she feels the mating and breeding impulse.

(8) This cry is unmistakably one of distress and is not a cry commonly uttered.

(9) This means war to the very death, if necessary.

(10) This is a modified form of craking, and is sometimes uttered by a sitting hen when running and flying, as if to express satisfaction over her temporary release from monotonous duty.

(11) With various species that nest on the ground there seems ordinarily an instinct of welcome to any flock mate that comes to lay, and correspondingly a preference on the part of the visitor to lay where another hen is "on." The purr of welcome resembles that of the cock when he is telling a hen where there is a good place for her nest, but is not quite identical.

(12) It is well known that when wild birds, as grouse, wild turkeys and others, give alarm of danger, the young ones will immediately scatter in all directions, hiding themselves, one in a place, among leaves, grass or bushes, the parent birds seeking safety by flight. This is called natural instinct. Our domestic fowls have not lost entirely their natural instincts, but retain all of them that are necessary for tame birds. When danger approaches, the hen with her brood, if she is not too heavy to fly will sound the note of alarm and the chickens will hide as best they may, she trusting to her wings for safety. The chickens understand and obey when she tells them to run and hide themselves. But the domestic hen is generally too heavy, besides having partially lost the power of flight by the disuse of her wings, to save herself in this way. The natural instinct seems broken, and she resorts to a mixed policy. She fights a little, runs about, and talks in a way hardly to be understood, and the chickens do not appear to know what course to take. So much for the influence of domestication and loss of the power of flight; nevertheless the chickens quickly know when their mother says, "Come here" or "Cut sticks and run away."

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COCK AND HEN.

(1) The "cut-cut" call to come and eat.
(2) Cackling before or after laying.
(3) Moderate cackling when a little disturbed.
(4) Crescendo cackling when much frightened.
(5) Cry when winged enemy is distant.
(6) Violent shriek when hawk is near.
(7) Cry when a creeping enemy is slowly approaching.
(8) Battle cry during actual conflict with man, snake, bird or quadruped.

(1) The call of the cock to his wives and the hen to her brood to come and partake of something good is so noticeable that nearly every child early learns to understand it.

(2) The cackle puzzled me till accidentally I learned its meaning a year ago. It has nothing to do with laying, except indirectly. It is the call of a bird to find the flock it belongs to, and is uttered on many occasions when no nest is near nor laying is in question. By association, the call which for ages was to find the flock is used on occasions of trouble or excitement, even though the flock is close at hand, and in such cases it serves as the clan cry. The rallying cry of the community.

(3) The fact that what is essentially the same cry can be made to express different ideas is well illustrated by the moderate way of cackling when a little disturbed. It is like the ordinary cackling after laying. It excites the main flock very little and they betray but a languid interest.

(4) On occasions of great fright the cackle, though it speaks the same word as in No. 3, is uttered with such vehemence that every bird, young or old, within hearing drops other affairs at once. Often the cock gets blood in his eye and prepares to fight if need be, and the hen, if caring for a young brood, is equally ready for battle.

(5) When the cock sees a hawk in the air at a distance he utters a rather mild, prolonged, crooning call, which means, "Danger in the air; better be on your guard, but there is nothing serious impending just now."

(6) How different the hurried and emphatic utterance of the cry last mentioned when the hawk is near and acts as if selecting a victim. The meaning then is, "Run for your lives!"

(7) There is a peculiar cry sounded by both hens and cocks when they spy a marauder on the ground, say a snake or a rat or a noxious quadruped, which is decidedly different from the cry of "Hawks." When the latter warning is sounded, all look aloft, understanding perfectly that the danger is in the air, and there is also a rush for the nearest shrubbery or cover of any kind. But when the cry is uttered which means that there is danger in the grass, or that a creeping, not a flying, enemy is approaching, none of the fowls look up, but instead glance circumspectly on all sides; neither do they rush for cover, which would do no good as a defense against a foe on the ground.

(8) When a fight with human kind, winged enemy or quadruped is

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raging, a snarling, shrieking sort of a cry is made, which expresses the feelings of hate and desperation. Sometimes the cry seems to indicate valor unlimited, and sometimes it appears as if desperation was mingled with fear, "I am in for it now; I may meet my death, but here 's to a fight to the finish, come what will."

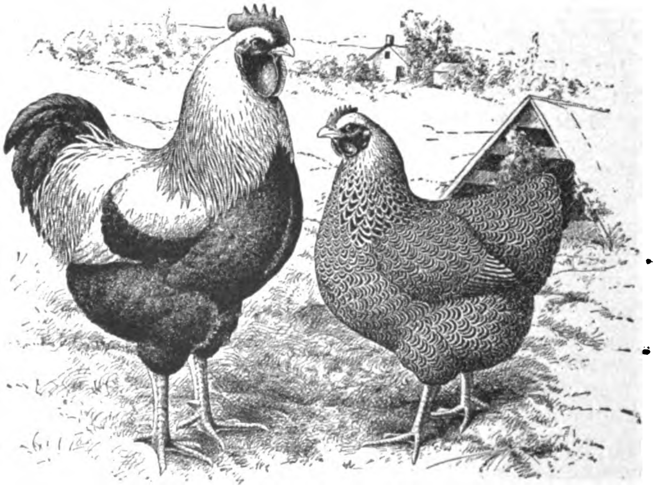
COCK, HEN AND CHICK.

(1) Chirp when happy.
(2) Exclamation when frightened and running.
(3) Lullaby, "Let's go to sleep."
(4) Chirp of sociability.
(5) Cry when startled.
(6) Scolding or bewailing when shut up.
(7) "Murder!"
(8) "I'm good Ingun; guess you are too."

(1) There is a cry of contentment that young chicks have, that resembles that which they utter when feasting. The adult birds of both sexes utter the same in deeper tones, but not so constantly.

(2) When birds are scared and running away from danger, their cry resembles the frightened form of cackling, but they shriek more and it is limited to a long string of "cuts" with no "ka-dar-cut."

(3) When young chicks become weary, a chill wind blows, drops of rain fall, or night closes in, how they gather about the coverlid that nature has provided, and in drowsy tones, like tired children, they seem to say, "We are sleepy, mother, and weary. Pray let us get into our little bed." And as they creep under the covering, listen to the mother as she sings her lullaby. It is one of the finest things in nature, as she makes that gentle diminuendo of sound, and all is hushed. The younglings croon to each other in the same way when the mother has said nothing, or when they are in an artificial brooder, and adults at



A pair of Silver-penciled Plymouth Rocks.

roost, after quarrels over disputed places are settled, say, "Let's go to sleep."

(4) There is a sort of good-natured "passing of the time of day" with comrades which means fraternity and sociability. Young chicks keep this up more steadily than adults.

(5) There is a cry that chicks have when startled and when they are not old enough to utter the cackling of alarm. This is gradually dropped as young birds develop, or rather it is imperceptibly merged into that form of cackling.

(6) When disgusted over being confined, or complaining at some other sort of affliction, yet not squalling overtly, there is a quiet whining, bemoaning, which means, "This is hard luck." This cry is set up when they are gently driven, yet not hurried or scared very much.

(7) When a hen is caught and fears violence or death, what is more distinctive than the shriek which means, "Murder! Murder! Help! Help!" Brave Chanticleer, if the episode is in the daytime, comes running at the signal, sets up cry No. 8 in the series "Cock and Hen," and is eager to fight.

(8) A cry resembling No. 4 is uttered when a very tame bird, young or old, is caught and petted, gently stroked or given delicacies in small installments. In only a few cases are circumstances just right to elicit this utterance. Once I thought that it was the same as No. 4 mentioned above, but it is slightly different.

Having treated very imperfectly the sounds that express forty-three separate feelings or ideas, I am aware that many others are conveyed by fowl language. If an observer should give time enough to the matter, it would be found out that just as hens and pigeons can tell strange birds from others, and can also distinguish sex, when to persons the specimens look exactly alike, so they understand some talk and some motions among themselves, the meaning of which is obscure.

Reader, do you ever listen to your fowls and endeavor to understand what they are talking about? It is mighty interesting. If you study your birds and become familiar with the sounds they utter, the many different ways of making and accenting the same or similar sounds, you almost unconsciously learn to associate each sound with a meaning of its own. After a while you know that a certain kind of cackle means return to the flock after nesting, or another form of cackle may mean prowlers, cats, dogs, foxes, or perhaps snakes. The "hawk cry" you probably know well. If you have attended to the wants of many brooder chicks you certainly know the "hunger cry," the pitiful bleat of the lost chick that can't find its way home, the "brooding cry," the happy little twitter which accompanies feeding, the contented going-to-sleep song when put snugly to bed, and many other sounds that all have a meaning to the observing poultryman. Knowledge of the different sounds and their meaning often may help a poultryman to make his chicks more comfortable and to prevent losses. Don't make any mistake, every cry of chick or fowl has a meaning and the others understand it.

Mr. Stoddard believes thoroughly in what he writes. He has been a

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close observer for many years, and you will find his telling of the meaning of some forty-three distinct calls, or variation of cries, of domestic poultry interesting reading.

Mr. Stoddard tells his interpretation of the cries of fowls and chicks in our own language. If you are at all observing you can not fail to recognize them and to perhaps read into them an even broader meaning. In any event it will pay you to study the language of your fowls, and it may help you to a better understanding of their needs.

A strong point in favor of the theory of a common ancestry for all breeds and varieties is pointed out by Mr. Stoddard, viz.: The language is the same for all from Asiatic to Bantam. Read the article and then go out and get better acquainted with your flocks.

LICE AND MITES.

By Prince T. Woods, in *American Poultry Journal.*

Fighting insect pests is a part of the regular summer work. There are a great many varieties of lice which affect domestic poultry, and they breed very rapidly in warm weather. All kinds of domestic poultry, including the several sorts of water fowl, are liable to be infested with vermin if neglected.

Lice feed chiefly upon the plumage and scales of the skin, and on young chicks may do a great deal of harm. Although they have no piercing organ with which to puncture the skin and suck the blood, it is probable that they do feed upon the body fluids where the skin is thin and tender, or where there are abrasions of the skin. They also are found in considerable numbers about the vent, where they undoubtedly obtain fluids and sometimes germs of disease which, when the lice are eaten by a fowl, as commonly happens, may develop the disease in it. It is believed that a number of diseases and some intestinal parasites may be spread throughout the flock through the medium of lice. They cause great discomfort to adult fowls and may kill young chicks. Sick or "dumpish" fowls are usually extremely lousy. When fowls are on the roosts or in the nests, lice travel from one bird to another. A lousy male may leave a few of his undesirable "guests" with a hen at each service. If they do transmit disease, as is believed, it is easy to understand that it will not take long to scatter infection through a large flock.

Of the eight or more varieties of lice common to the fowl, each variety has a particular portion of the fowl which it makes its regular headquarters. Two large and plump varieties of lice seem to find the plumage of the head and neck of adult fowls particularly desirable as places of residence and for a feeding ground. These are often found on the heads of chicks. Another long, slender, dark-colored variety makes its home among the barbs of the long wing feathers, but will leave that location quickly for the head of a tender chicken. Still others frequent the soft fluff of the body and abdomen. At least two varieties, one large and one small, are pale colored and are the nomads among the poultry vermin. They are known as pale wanderling lice, and leave the fowl to explore the

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person of the attendant, or may be found in nests or in any part of the poultry house.

Lice breed on the fowl in the plumage. The eggs or nits are laid in the soft, downy parts of the feathers. There is no doubt that lice cause intense irritation through scratching and biting. They are equipped with sharp claws, which must cause the fowls and chicks great discomfort. It does not pay to feed poultry and lice at the same time, and lice and young chicks is a combination which invites disaster. You can't keep chicks comfortable if they are lousy, and if you can't keep them comfortable you will have "poor luck" in rearing them. The lice, however, will thrive without encouragement.

These pests breed the year round, but are most troublesome in warm weather. Though they breed on the fowl, they can live for a long time off the fowl's body, and may remain for some time in a nest frequented by lousy fowls, or may live several days on the clothing of poultry pickers.

Red mites are the poultry bedbugs, and breed in cracks and crevices about the poultry house, particularly about roosts and dropping boards and under accumulations of poultry manure. They can live and thrive for weeks and even months without a chance to feed on the blood of fowls or chicks. The "red" mite is red only when filled with blood, and if empty is pale or gray in color; when filled with partly digested blood it may be nearly black. The young are almost colorless. These night-prowling pests are equipped with piercing and sucking organs, and bleed their victims to feast on the life-giving fluid. Many red mites about the roosts will prove a great drain upon the vitality of the flock. They also act as carriers of disease. Usually they are found in their "dens" in the cracks and other hiding places about the poultry house during the day, and at night they swarm over the sleeping fowls, disturbing their rest and sucking their blood. They have been known to drive sitting hens from their nests, and in some cases it is believed that they have killed sitters. If present in considerable numbers they may quickly kill newly hatched chicks.

Among the several other varieties of mites affecting poultry the more important are the depluming scab mite and the scaly-leg mite. The former builds scabs or crusts about the roots of the feathers, which cause them to break off and leave a dead stump, which eventually comes away with the scale, leaving a bare or bald spot; the scaly-leg mite causes that unsightly condition known as scaly leg.

REMEDIES.

It takes constant warfare to get rid and keep rid of lice and mites. For lice insect powders must be used, and there are several good ones advertised at moderate prices. Lice liquids are useful for both lice and red mites. Ointments are necessary in order to get rid of scab or scale mites.

Insect or dusting powders, to be offensive, must be worked well into the plumage, down to the skin, all over the fowl. The best, most effective and most lasting in good results is pure, fresh-ground Persian pyrethrum powder. A thorough application made at night and repeated in one week gave freedom from lice for a period of three months, when

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the powder was again used, with like good results. This insect powder is not a proprietary article and is expensive, but the results make it worth the price. To be effective, it must be fresh-ground and unadulterated. If old, or mixed with some cheap adulterant, it is worthless. Any reliable druggist should be able to supply it. As a rule, it sells for about 30 cents a pound. It is excellent to use on fowls, sitting hens and on the heads and bodies of small chicks to get rid of body lice.

A good, cheap lice powder, but less effective than pyhethrum, may be made by mixing fifteen pounds of fine-ground tobacco dust with two pounds each of pulverized slaked lime and powdered naphthalene.

For use on the roosts and dropping boards, to keep down lice and to kill red mites, lice liquids are excellent. There are many good ones advertised and you can make one cheaply at home if you care to take the trouble. Simply dissolve in kerosene all it will take up of crude naphthalene flakes. One gallon of kerosene will dissolve about one pound of naphthalene. Apply to roosts and drop boards in the morning after the fowls leave the roosts. It should have several hours to dry before the fowls occupy the roosts again. Any lice-killing liquid will blister fowls which roost on perches wet with it.

For scaly leg and depluming mites the following ointment is excellent: Hebra's itch ointment—mix 15 parts of oil of cade with 30 parts each of lard and green soap, then gradually work in 15 parts of sublimed sulphur and 10 parts precipitated calcium carbonate. Any druggist can supply it. Rub the ointment well into affected parts every other day for a week. Then wash parts with warm water and hard yellow soap. Repeat, if necessary to effect a cure.

People who have had the experience know it to be a positive fact that frosting the toes, combs or wattles of a hen will put a stop to egg production. The old hen man will tell you that a hen will not lay again until spring if her toes once get frost bitten and if the weather nips her comb. She is so fastidious that she will not visit the nest again until her head piece has resumed its normal condition. This may be simply obstinacy and perverseness on the part of the old hen, but we must take her as she is and not as we would like to have her. It is useless to criticise her, nonsense to blame her and the height of folly to abuse her. —*Mrs. B. F. Wilcoxon.*

A. B. Hall, a grocer of Emporia, Kan., comes to the front with the banner hatching story. He says that although the hen was taken from the nest several days before the eggs were due to hatch, he got twelve chicks from fifteen eggs. The hen was housed in a shed near the store, and as she seemed to be suffering from the heat, she was removed from the nest. The eggs were not disturbed, and five days later twelve sturdy chicks hatched out. The intense heat of the day, which was lessened only a few degrees at night, kept up the process of incubation. I. F. Myers, a merchant of Kewanee, Ill., had a similar experience with a setting of eggs.—*American Poultry Journal.*

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CAUSES OF DISEASE.

By J. A. THORNHILL, in *Successful Poultry Journal.*

Fowls are like the human family—heir to many diseases. The causes of many of these diseases can be traced to filth or dirty quarters, poor digestion, lack of physical stamina in the parent stock, the continuous use of two much fat-forming food, improper housing, drinking of stagnant water, the lack of animal and green food or to allowing too much of both at one feeding. Lice and overcrowding also contribute to the cause of many poultry ills.

As it is with disease in the human family, so it is in poultry—much can be done in the way of prevention. To prevent disease among poultry, everything must be done with an eye single to "cleanliness." The housing, yarding, watering, feeding and general care come under the word "cleanliness."

If disease once gets a strong foothold in a flock, active measures must be at once taken and the following rules observed.

First. Separate all well fowls from those that show signs of the disease. Put the well ones in clean, dry quarters and do not allow any of the diseased birds to get into or near their quarters. If any in the well pen or pens show the least sign of the disease, immediately remove them to the sick quarters. All poultry diseases are not contagious, but as a rule the above advice works to good advantage. Spray both the sick and well quarters with a strong solution of a reliable disinfectant.

Second. Destroy all badly affected birds. It is a waste of time and money to treat fowls that are badly affected with any contagious disease. The few that might be saved would n't be worth your time, nor would they make suitable breeders.

Third. After stamping out the disease, don't make the mistake of returning those birds that were n't affected to the old quarters until they have been thoroughly cleaned, whitewashed and disinfected with some reliable coal-tar disinfectant. Formaldehyde or sulphur candles burned in the hennery for some months after the disease will also help matters.

CHOLERA. This is a fatal disease. It is very little understood; it is swift in its work, and is very contagious, and the best thing to do is to kill all badly affected birds and burn their remains. The cause of cholera is filth, drinking stagnant water or the bringing of the germ from a yard which has had the disease, by birds, coop or fowls. The bowels become watery. The fowls show a lack of life; they mope off into a corner; the droppings become bloody, caused from the inflammation; the comb turns very dark. Affected fowls are very feverish and will drink water freely. It takes the disease from three to ten hours to kill a fowl after infection. A pill containing 2 gr. gentian, 1-10 gr. opium, and ½ gr. calomel will be found the best remedy for cholera. Give one pill every six hours until the color and consistency of the bowels change.

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Roup. Most poultry raisers have had more or less trouble with this disease. Its ravages among flocks whose owners do not thoroughly understand its effects amount to almost an epidemic. Roup may appear at any time, but is most apt to appear during the fall and winter months. The cause of roup is a neglected cold, which may be contracted in several ways, but the worst cause of colds among poultry is roosting in drafts. Fowls that are too crowded at night leave the roosts in the morning very warm, and the cool air causes them to contract colds. These colds, if not properly treated, develop into roup. The first sign of roup is a watery discharge from the nostrils; the upper part of the mouth fills with a hard, cheesy matter of a very offensive nature, and the eyes often swell shut; the comb will turn black, and the bird drinks very badly at this stage of the disease. Fowls with roup are very feverish, and medicine that can be put into the drinking water is the most reliable and easiest administered. Permanganate of potash in proportion of 10 grs. to a gallon of water is the best roup cure yet found. Ten grs. in one-half gallon of water, and the head dipped into the solution, is very good for roup in the head and eyes.

Canker. This is a disease that not only affects weak birds, but will appear among well ones. Moldy litter, feed, etc., is generally conceded to be its origin. There is difficulty in swallowing; white or yellow spots appear over the mouth, especially under the tongue, and the bird will shake its head and stretch its neck as if trying to shake or dislodge something in its mouth.

The best treatment is to remove the yellow scab or pus and sprinkle freely powdered permanganate of potash or burnt alum over the raw sores. Boric acid sprinkled over the sores has also proven of benefit. Remove birds from the flock when the disease is discovered.

Lice. While lice are not a disease among poultry, they are directly the cause of more poultry ailments than any other trouble known. They are to be found wherever poultry is raised. If your fowls look sickly, not laying, and are picking at themselves, the first thing to do is to apply some good lice powder.

We honestly believe that the poultry industry of Kansas brings in more net profits, one year with another, than all the hogs that are raised and fed in the state. To be sure, the entire value of hog products is much greater than that of poultry, but you will notice that we said net profits, which means real profits and not paper ones. We know of men who, from 200 hens, are making a good living, paying all expenses and putting money in the bank. Such men own their farms, which in most cases are small ones, and they have learned that the best and safest way to market their crops is through their poultry. There are many who sell from $300 to $500 worth of poultry products every year, and do this on forty- to eighty-acre farms, besides raising a colt or so each year, a few hogs, and keeping several cows. To our mind, this is much better than to branch out into "big farming" and make their home into a hotel for hired men.—*A Jayhawker, in Nebraska Farmer.*

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CHICKEN NOTES.

It used to be the farmer's wife who toted the eggs to the store in exchange for groceries, but it is the farmer now who carries the eggs to market in exchange for coin with which to buy the groceries and automobiles.—*The Feather.*

Keep a good lookout for rats; they will do quite a lot of mischief in one night. I once caught ten in a wire trap between sunset and sunrise—so many that there was not place for them to stand singly, but I lost no more chicks for quite a while.—*Ella H. Stratton.*

By careful breeding and selection through a series of years, the Maine Agricultural College has produced a strain of hens that lay over two hundred eggs a year. The record hen of the lot laid 251 eggs in twelve months. The average hen lays about 80 eggs per annum.

The skin of broilers is very tender, and often you can get as much for them alive as you would dressed, especially if you are not an adept at the business of dressing them. A bird with torn skin will never sell at top prices, so better ship them alive if the market warrants.—*Ella H. Stratton.*

Rape and lettuce are two excellent green feeds for fowls, and a patch of both will not come amiss. The stock of lettuce, instead of being pulled out by the roots, may be cut off, and by following this plan two or three cuttings may be had. Rape is greatly relished, and being of a peppery taste, makes a good tonic.—*American Poultry World.*

Place your coops for the little ones near some shady place, and there scatter coarse, strawy manure about three inches deep; then keep it moist at the bottom, if there is no rain, and watch the little fellows go down after the angleworms that flourish at the bottom, and you will see your chicks flourish also. The currant brush is a good place.—*Wisconsin Farmer.*

In taking young chickens from an incubator you will always find some much more lusty than others. Sort them out and put the strong ones together and the weak ones by themselves. If all are put together the strong ones get all the food, and they are very apt to trample the little ones to death. After they have all "got on their legs," so to speak, and eat well and can defend themselves a little it is well enough to put them all together.—*Successful Farming.*

As to the proportionate size of the house to the number of fowls kept, only he who remembers that "there is more profit in a house half full than in a house twice full" is safe from blundering at this point. The most level-headed practical poultrymen insist upon ten square feet per fowl. Contrast this with the room afforded 100 fowls in a 12 x 20 house, less than 2⅓ feet of space to each (which is a common sight), and judge as to the chances for eggs in the latter case and take warning.—*Wisconsin Farmer.*

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CHICKEN NOTES.

Often the statement appears: You can feed a small flock of hens on the scraps from the table. It is true that scraps from the table will help to reduce the food bill, but very few hens can be kept on the scraps from the average American table. Do not be misled; it takes plenty of feed to grow poultry.

In 100 ordinary eggs there are twenty-two ounces of lime. This shows the great need of lime—best supplied with crushed oyster shells. These are cheap when bought at wholesale, and even if not, they are cheap at most any price, for they prevent soft-shelled eggs, that greatly induce egg eating. Do not think of going into winter quarters without a generous supply of the shells.—*Indiana Farmer.*

The purpose of housing fowls is to increase productiveness. A little shelter from the cold winds and storms will add to the comfort of the fowls, and therefore to the egg yield. A cold wave means a check to egg yield, and the reason is probably because the change means a sudden demand for increased fuel or food to keep up the heat of the body, and the food that has been going into the making of eggs will be drawn upon for that purpose. It is the food that furnishes the heat.

Experience with twelve of the leading varieties so far has proved that the Plymouth Rock is the most rapid flesh former, making a good market chicken between three and four months of age, provided the young bird is properly cared for and pushed from time of hatching. The Wyandottes mature rapidly, making a round, plump market chicken at from four to five months of age. Brahmas do not take on flesh quickly while growing, but after seven or eight months make a fine, large bird. Either of the first two named will be found to make early chickens for market.—*From Report of Canadian Experiment Farm.*

While it is not possible to state the exact average production of eggs per hen in one year, it is conservatively estimated in the United States to be about 70. By improved methods of breeding, feeding and selection birds have been found with actual individual records of 200 to 257 eggs a year. Only one hen has been found, at Cornell, that laid as high as 257 eggs in a year, but this one example of the degree of perfection to which the breeder's art has attained is valuable for the pace it sets for others to follow and surpass. The net profit obtained from the sale of these 257 eggs amounted to $5.06.—*Christian Herald.*

What is a laying hen? The apparent answer is, "A hen that lays." On second thought you will concede that the hen which does not lay is a rarity, so we will look for another answer. I contend that before a hen should be entitled to the right of being called a laying hen she should prove her ability to lay enough to pay for her feed and care and to pay the interest and wear and tear on the equipment used in caring for her, plus a profit on the keeper's investment. If a hen can not do this she should not be called a laying hen, even though she does shell out an egg occasionally.—*C. I. Bashore, in Poultry Topics.*

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THE GUINEA FOWL.

By Sara A. Little, in *American Poultry Advocate.*

The guinea fowl is a native of Africa, and is found in a wild state in many sections of that great country, as it is in Madagascar. Guineas were known by the ancient Romans, who were very fond of them for food. They called them "gallina Numidica," (hen of Numidia). They also called them Meleagoris, from the fabled sisters of Meleager. Meleager's life was said to have depended on the preservation of a certain firebrand. From feelings of revenge, his mother cast this brand into the fire, where it was destroyed, and the man died. His sisters grieved so deeply over his death that they were transformed into guinea fowls. Possibly the complaining wail, which is one of the cries of the male guinea, is a survival of the demonstrations of sorrow in which Meleager's sisters bemoaned him. Who can tell?

In the wild state guinea fowl are found in large flocks, but in the breeding season they usually mate in pairs if the sexes are evenly divided.

While guineas are more at home in a warm climate, they will endure as much cold as the domestic hen. They do not begin laying in western New York until about the middle of May. I presume a warmer climate would show egg production at an earlier date. It is difficult to impress customers who are not familiar with the habits of guineas with the fact that hot weather is the time to raise these little birds. Orders are sent for eggs for hatching for "immediate delivery" in March and April, and I even had one inquiry for guinea chicks three or four weeks old for Easter gifts. The Pearl guinea is the best known of the species. It is bluish-gray in color, with white dots on all its plumage except some of the wing feathers, where the dots are elongated into little stripes. There are other varieties: the Lavender, which looks like a Pearl guinea badly faded; the peacock, which is dark and not especially attractive except as a novelty; and probably others. The White African is a truly beautiful variety, pure white, hardy and very desirable. Though by nature wild, the guinea, when reared by quiet domestic hens, is as tame as most poultry. Mine swarm around my feet at feeding time and when perched on fences rarely move when I pass near them. When caught they make rather vigorous resistance, but they soon give up and show little fear.

In starting a flock of any kind of poultry it is usually wise to buy stock, as there is less danger in transit than with eggs. In the case of guineas the eggs are small and have very hard shells. They ship well if well packed, and usually hatch well. The price of guinea stock is not so high as to prohibit purchase, and more eggs are secured from a pair of birds than from the same money invested in eggs. Then one learns much of the habits of these curious birds by having adults to study before the chicks come, and their odd antics afford much amusement. The food for the breeders is the same as for domestic fowls. They are good foragers when the ground is free from snow, and they do little damage unless it is to strawberries. They have a consuming fondness for ripe, red strawberries. They prefer to roost in trees, but are glad to seek the shelter of the henhouse when storms or real cold are in evidence. Their diseases are the same as those which visit hens, and the same care must be used to keep insect pests away. They do not bear confinement well, though in winters like that of 1912 they make little use of their liberty. The guinea male will mate with five or six hens, but I think that most breeders agree that, where practicable, mating in pairs is much better. When the guinea hen hatches the male assists her in caring for her brood, and each pair will keep their own flock separate from the others until they are old enough to run together safely. Tame guineas will usually nest near home. They have great caution and quick tempers, and if their nest is in any way disturbed they are likely to desert it. Sometimes they leave nest and eggs undisturbed, sometimes they break the eggs and tear the nest to pieces like veritable little whirlwinds. When on their nests the hens have a distinct call, which is quite indescribable, but which ends in a "buckwheat, buckwheat," which is the distinguishing cry of the female. Hidden nests are often found by this cry. When a nest is found, the eggs taken out should be replaced by clean nest eggs. I boil part of the infertile eggs from the incubator each spring, mark them "bad" with an indelible pencil and keep them for this use. The good eggs should be taken out daintily so the nest may not be disarranged, as Madame Guinea does not like to have any one tamper with her housekeeping. The eggs which are brought in should be turned daily, and as often as fifteen are secured it is wise to intrust them to a reliable sitting hen. In this way I reared sixty guineas from one pair of birds, but the hen laid seventy-one eggs before she became broody. Last year the hens became broody after laying from thirty to forty eggs, but when not allowed to sit they laid a second clutch, and one hen was found with thirty eggs in her nest early in September. She was allowed to hatch, but the weather was too cool and none of the chicks grew up. The youngsters feather quickly. Chicks hatched August 10 matured nicely. Their wings soon become strong, and they "take to the trees" at an early age. One flock with a Leghorn mother were roosting in a tree the twenty-third evening of their existence.

Guinea eggs hatch in twenty-eight days. It is wise to watch the nests after the twenty-sixth day, as an occasional bird hatches prematurely, disquieting the hen, or getting out of the nest to be chilled. Take the early birds to warm quarters to wait till the others hatch. When a domestic hen is to mother the brood the coop in which she is confined should be surrounded by a tight little pen, from which the wee birds can not escape. They are so very small and so very lively that the pen must be secure. Keep them in for a day or two till they have learned the language of the hen. The little fellows are good linguists and but a short time is required. They are very independent, and in a few days will wander some distance, always in a close little group. If frightened they make a great volume of noise for such small birdies. The sound is much like that of young ducks. When heard it is wise to hunt them up

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and drive them back to their mother. After a week the hen may be liberated, but it is wise to shut her in nights for another week. The youngsters follow their mother closely and do not forget her as long as they live.

Stale bread crumbs, with plenty of sharp grit and a never-failing supply of water, are their first food. Give the hen wheat, and by the time the chicks are a week old they will begin to eat with her. They are such good foragers that they find variety in their bill of fare for themselves. Where the guinea hen hatches her own eggs she is apt to make bad work of it, unless the earlier eggs have been removed. If she has no more than twenty, she needs little care, as she is well calculated to look after her brood. When the eggs have been taken out of the nest daily and the guinea becomes broody, watch when she is off the nest for food and put a nestful of good eggs in the place of the nest egg. Her mate will protect her, and when she hatches will assist her in the care of her brood. They may bring the youngsters to the barn for food, but if insects are plenty the chances are that the whole flock will remain afield till the infants are three or four weeks old. The eggs of the guinea fowl are highly esteemed as food, and the flesh is very rich and gamey. It is much relished by most people. There are several guinea farms in New York state where large flocks are raised for broilers and roasters. The little birds are so hardy and need care for so short a time that they offer but few problems to the breeder which are at all difficult to solve. Possibly the hardest one is to find their nests, while another is to distinguish between the sexes. After one has put a leg band on everyone which says "Buckwheat," he may safely decide that all the females are banded and that those which wear no bands are males, but it is a tedious task to make the selection.

Dr. N. W. Sanborn, in *American Poultry Advocate:* Why is it that more folks do not raise guineas? As I drive about the country, get into the small poultry plants near the large towns, I see few of the guinea fowl. Those that I do see are on farms owned by people who have always lived in the country and are over fifty years of age. The few exceptions are the small flocks that are raised on the plant of some wealthy city man who has a country place. The common-sized flock in the fall does not run much over twenty in number of the guinea. I have never seen over fifty on any farm I have visited. Most folks who raise guinea fowl do it for the meat rather than the eggs.

The guinea is still half wild in its nature, looks fierce and half crazy, and is still more queer in its cry. It prefers the tall tree to the henhouse, the stolen nest to the one in the poultry building, and is in fighting mood more than the common poultry in the spring. I have been successful in doing what I wished with the guinea. I have never tried to raise large numbers or make a commercial success with them. They have been a profitable line with me, but much less so than the domestic poultry. My first object in raising the guinea was to get some dressed poultry for my own table that was in a class by itself. Those of you who like game at all will appreciate a well-cooked guinea when served at the Sunday dinner. With the disappearing of wild game will come the paying profit in the raising of the guinea. The second reason for my keeping the guinea is that they make the best watchmen to sound the alarm at the sight of danger. Let a hawk appear in the sky and they set up such a cry that every chick and hen will scud into the brush. into the house, before Mr. Hawk can get near his intended victim. Is the hawk afraid of the guinea? It is commonly said he is. I have never seen anything to indicate to me that he paid any attention to the guinea, or its cry, unless it was to turn his attention to other farms that were without the guinea. The guinea, with me, seldom lays over eighty eggs. The nest is selected with special care, out in the pasture, away from the buildings, in the last place you would think of looking for it. It takes a lot of time to run down a guinea and find that nest. She will lead you all about, except in the right direction, and while you are looking where you think the nest is the guinea hen will disappear, to your disgust. If it is well along in May or June, and you find the nest, there may be twenty, twenty-four or more eggs in it, small, pointed at one end, prettily colored, with hard shells. The eggs are gamey, rich, splendid for custards.

There is no market call for the guinea eggs. They are kept and used at home. If you allow the guinea to hatch eggs, or you put them under the common hen, you will find that they are from twenty-six to thirty days in incubating. As you would expect, the little guinea is small. I have never let the guinea hatch and raise the young. It is too wild to do this with any satisfaction to the owner. Use the good old mother hen in hatching and rearing the guinea. The guinea will follow the hen that broods it long after it is mature. I have now, in the month of March, a hen that raised sixteen guineas last year, and they will go where she does when they can. Raised by the guinea, the next generation will become wild and hard to handle. With the hen they are most sure to go into the house on very cold and stormy nights, rather than roost in the tall elm trees. I have had one flock of guineas that persisted in roosting in a tall elm tree, that was caught there in an ice storm, toes frozen to the limbs of the trees, and when spring came every toe had lost a part. This winter my guineas go into the trees at night on mild evenings, but take to the roosts of the henhouse when it looks to be very cold. I plan to hatch enough so that my table is supplied with guinea meat to our satisfaction and leave birds enough to give me hatching eggs another year. Few of us care to have over forty guinea chicks, unless near a colony of city folks who want dressed guineas in the early autumn. In a neighboring town there is a good call for two-pound guineas in September at a dollar a head.

In *Successful Farming* a writer says: The guinea is fast becoming a favorite article of food in America, being used as broiling and roasting fowls in some of the finest hotels. This fowl has a plump, round body, a full breast and small bones, making it very desirable and good. The flesh of the young fowl is unsurpassed, while that of an old fowl is tender and delicious when properly cooked.

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Guineas are great roamers, and, like turkeys, will subsist on insects and seeds. Guinea hens lay a great many eggs, but as they are nearly always inclined to lay in one nest, it is most profitable to remove the greater number and place them beneath common hens. The eggs should be gently rolled away from the nest by means of a small paddle before touching them with the hands, as the nature of the guinea is such that she can quickly detect it if the eggs have been removed by hand. Sometimes they are removed from the nest by means of a long-handled spoon. When the guinea discovers that her hidden nest has been disturbed by hands she nearly always abandons it for another.

It is best to allow the guinea hens to hatch their own eggs if they have a proper number for a sitting, or take away the surplus and allow them to set and raise their young, as in this way they are no bother whatever. It requires four weeks for the keets to hatch. They are very delicate until well feathered.

Guinea keets are quite like turkeys, though much smaller. Their food for the first week or ten days should be composed of small particles, as recommended for the young turkeys. Like turkeys, they should have fresh water to drink and be protected from the damp, but not kept from the sunshine and fresh air. When raised with common hens they require a fence of fine mesh to keep them from straying away, for they are so tiny that they can be found only with difficulty.

The White guinea is tamer than the Pearl guinea, and more apt to stay about the yards. Guineas possess the virtue of being able to keep hawks from the premises by uttering their shrill cries, which is their custom at the approach of anything strange.

L. Harris Crewe, in *Farmers' Review:* We find in the guinea probably more of the habits of a wild bird than a domesticated fowl. It cares to roost in high trees in all sorts of weather rather than enjoy the comforts of a sheltered and warm house. We find it nesting on the ground in the high grass and rearing its young largely on seeds and insects. But it is not wise to allow it all freedom. It is far better at approaching cold weather to train it to sleep in a house, because its head is not protected with feathers, and many times the poor bird is badly frosted, and in no few cases frozen outright.

Guineas are naturally wild, but with gentle care they soon become very tame. I have found a most excellent way to get and keep them tame. Incubate the eggs under chicken hens. In many instances they have remained with their foster mother not only that year, but the year following.

One of the most essential things in guinea culture is to avoid inbreeding. Of all things start with birds that are in no way related. If you begin with eggs, dispose of every male bird and purchase others from an outside source, and inquire if they can in any way be related to your stock. Inbreeding in guineas will demoralize your stock so badly that in a few years you will be compelled to give it up as a bad job. It is well to have two males, if only three or four hens, as some of the females may not take kindly to a particular male. One male to three or four

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hens is about right when in a flock, yet good success has been attained with just double the number of hens.

Guineas begin laying about April 1, if the weather is warm and pleasant, although they may lay much earlier. During the laying season, if they have free range, a little corn and wheat each day will help keep them in good condition. As it is such a nuisance to have to look over a large farm to find their nests, we find it a good plan to keep them penned in their house until about four in the afternoon. As a rule, all have laid by that time, and then they will have about three hours in which to roam on the fields and meadows in search of that which they crave most—bugs and wild seed.

In setting, put from twenty to thirty eggs under a chicken hen. Line the nest with tobacco stems to keep away lice, or use some good lice killer. On the twenty-eighth day they should all be hatched. Do not feed for twenty-four hours or longer, allowing the young birds to remain quiet under the hen. As one large hen can hover forty to fifty young, it is well to set two or three at the same time. If a good hatch is the result, two mothers may be used—if a poor one, all may go with one. Of all things, do not set guinea eggs too late, for the chilly mornings and heavy dews of early autumn will cause nothing but disappointment.

As a parting word, see to it that the little fellows are under roof at night, away from rats and other pests. See that the grass is dry before they are turned lose in the morning, and give them only to the care of a good and quiet mother.

FACTS ABOUT GUINEAS.

By JOHN CLARK, in *Farm and Ranch.*

Many farmers and their wives do not think the noisy guinea is of any value, and many do not care to own that they are so prejudiced against them. They are great company, and you soon learn to love their continual welcome call of "Come back, potrack," and miss it ever so much, even if away just for one night. This prejudice among farmer folks should, and I believe will, be overcome when the true value of the guinea is made known to them. They cost practically nothing, they are such great foragers, but take the place to a certain extent of the farmer's friends—the birds. They often go a mile from home, and it furnishes food for thought to see them busily hunting under every leaf and bud for bugs and worms. They destroy so many obnoxious insects that every farmer should have at least thirty on his farm, for in this respect they are of untold profit, not to say anything of the nice, juicy meat for the table, and eggs—my! how they do lay!

Since game birds have become so scarce, young guineas come nearer than anything else to taking place of the quail. Perhaps few people realize how much like quail the young guinea is in looks; just sample one and you can hardly distinguish the difference. In my opinion they are much sweeter than chicken, and I have had people at my home say they would not eat guinea, sit down to a plate of fried "chicken" (guinea) and pronounce it the best chicken they ever ate.

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The guinea is a hardy bird, almost free from diseases that affect other barnyard fowls. They generally die from old age, or at least ours do, but up to about four weeks of age are very tender. They begin laying in April and lay steadily until about November. Their eggs are very rich, though small, and are so nice in baking, and the thick shells make them less susceptible, and they will stay fresh about twice as long as hens' eggs; this is a valuable quality, as eggs are so hard to keep in summer.

Guineas generally go off from home, like the turkey, to build their nests, but I know from experience they will mate off in pairs if a sufficient number of males are kept. This is not desirable, as the eggs are then so hard to find. I think it best to keep one male to about every fifteen hens; then they will nest together, from ten to twenty laying in one nest. In this way they will also hatch well. Often in a single nest are found 75 to 100 eggs; this is indeed a pretty sight. Their wild instinct makes them very shy and foolish about their nest, and you must not put your hand in it to take the eggs out, as they will then make a new one; but by using a long-handled spoon to remove the eggs, leaving six eggs in the nest, I have had them lay in the same nest for two months.

At about ten o'clock A. M. listen for their peculiar cackle, and by going straight in that direction you can easily find the nest. They do not get broody until about September, and the guinea hen does not make a good mother, she runs the little ones to death. I like to have the hatch come off in May or June. Set at least twenty-four eggs under a chicken hen; they hatch well, or that's my experience. It takes twenty-eight days for them to hatch, and they are very small when hatched—but, oh, so cunning! Do not molest them until twenty-four hours old, but be sure they can not get out, or they will run off; then take them out and put in a floored coop, so they can not get out and run away, and keep them there with the hen about a week. Feed carefully, not too much at a time, on clabber cheese and bread crumbs for about two weeks, never overfeeding, and by this time they begin to take the old hen off. They now require but little food—and how they do grow! At six weeks old they are about partridge size and are just as fine game birds.

I never kept account of the profit from our guineas, but know they bring good returns in eggs and meat, and their welcome call makes home more cheerful. They have a great instinct of approaching danger and are valuable in saving the lives of chickens from hawks and snakes. This alone would pay for their keep, not to say anything of their other paying qualities.

The guinea should be raised more, and, I think, written about more, in order to help overcome the universal prejudice against them, for they are indeed the farmer's friend, for they bring profit in so many ways.

There is a profit in raising guineas. Their eggs are as good as hens' eggs, and their flesh has the flavor of wild fowl and is popular with epicures. They are harder to raise than turkeys, and will glean a living from orchards and fields. The White guineas are preferred, as they are peaceable anr more domestic in their habits than the Pearl variety.—*Poultry Topics.*

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GUINEA CULTURE.

By HUBERT HESTER, in *American Poultry Journal.*

Guineas are becoming more and more popular each year. They are to-day one of the leading farm fowls.

No better guard for hawks, thieves, etc., can be found than the guinea, with their quick, alarming cry.

There are several kinds of guineas, most of which are good, although I think the Pearl guinea or the old-time Speckled guinea the more desirable.

It is best to set the eggs under a common hen rather than a guinea hen, because a guinea hen has a disposition to roam too much. Another reason for not using the guinea hen is that she is very careless with the small guineas.

The best time to set guinea eggs is about the last of July or sometime during the month of August. They do better at this time because the dews are not so heavy, and another reason is that they will come off just about the time grass seeds begin to ripen.

As a rule, guinea eggs hatch very good. They should be set on the ground in some cool, dry place, where the water will not rise up under them. Care should be taken to keep the hen free from lice while she is sitting, as lice or mites will kill a small guinea in a very short time.

After the guineas come off they should be put in a good, dry pen or coop. A good pen can be made by stretching poultry wire around the posts of a grapevine. This affords good shelter and plenty of shade for them. The ground should be high and dry, as dampness is very injurious to the young guineas. It is best not to feed the guineas for about twenty-four hours after they are hatched. I find that the best feed for them is stale bread or something of that kind, crumbled fine and dampened or mixed with thick buttermilk or any other kind of milk.

They may be fed this kind of feed three times a day for about a week or ten days. Then the food may gradually be changed to grain and other foods. The most critical time in a young guinea's life is when it begins to send out wing feathers. Especial care should be taken not to let them get wet during this time.

Do not feed too much, and look out for bowel trouble. Another good thing to look out for is lice and mites. If you should happen to find any lice or mites on them, a good way to get rid of them is to first scald and clean out their pen and sprinkle lime freely. Next take each little guinea and put a small lump of common hog's lard on the head, then dust "Black Flag" or some other insect destroyer freely on the hen and guineas.

As a rule, the young guineas are very lively and grow at a rapid rate. Usually, after the hen weans them, they fly into some near-by tree to roost. After they are weaned they will make some of their living on grass seeds, bugs, insects, etc., but care should be taken to see that they get enough to eat. During the winter they require about the same amount of food as an ordinary chicken.

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They do not lay during the winter, but begin about the middle of April. They will lay almost every day from that time until October.

Guineas may live to be several years of age, but are not as much profit after the second or third years as they were before they reached that age.

ABOUT REARING GUINEAS.

By A. C. McPherson, in *Successful Farming.*

It will be profitable to those who raise poultry of different kinds if some guineas are included. The guinea has been kept in the background from ignorance of its merits as to its egg-producing qualities and fine table possibilities. There is less loss in refuse of the guinea than of chickens, and the amount of protein is higher, while the amount of fat is less. It is estimated that guinea fowl yield as much actual nourishment as medium cuts of beef, pork or mutton. There is a growing demand for them in New York and other eastern cities. They take the place of game birds at restaurants and hotels, and young guineas bring fancy prices early in the season in city markets.

Guinea eggs have long been esteemed for their superior flavor. The yolk is larger in the egg of the guinea than in that of hens, and when analyzed contains more fat. Guinea eggs are more fertile than eggs from chicken hens, and it is best to use hens for incubation, as the young guineas, or keets, as they are called, become more domestic in their habits than when allowed to stroll off with the guinea mothers. They become so wild when left to their own devices as to not be seen for days at the farmhouse. The food costs but little, which is another point in their favor, because they live almost entirely upon insects, seeds, etc. This diet causes them to rank as game birds in England, where they are kept in large numbers in parks and game preserves.

They are raised in the southern states in larger numbers than in the North. Some object to them on account of their harsh cry, but in reality their cry is no more discordant than that of ducks and geese. They put to rout hawks and other enemies before the owner can appear, and they are protectors of the other poultry on this account. Many farmers keep a few guineas on this account alone, and but little stock is taken in them further than an occasional use for the table and for eggs. The guinea can be cross-bred with the chicken, but such cross-bred birds are always sterile.

The guinea is not to be depended upon as a sitter. Four weeks are required for incubation. The young keets show much agility as soon as they leave the shell, and, as they are so small, some breeders place the nests in boxes covered with wire netting to prevent them getting lost. They should be kept in confinement for a week; after that they can be allowed to run with their mother if the weather be good. The keets will generally stay with the mother hen for a few months, and if a good, motherly home-keeping hen is selected for their brood mother, their wild instinct can be checked to a large extent. The keets grow rapidly, but, like turkey poults, are delicate and can not stand cold nor damp when young. It is best to have them hatched in May or June.

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The keets should be fed soon after hatching, and as their crops are much smaller than those of chicks, they should be fed several times a day. Do not neglect them for a few hours, or death will result. Table scraps, minced onions and hard-boiled eggs, etc., are best for them. Ants furnish the most satisfactory food for the young keets, and when allowed to range they will appropriate these dainties for themselves, and so balance their rations. Bread and milk and cottage cheese are much liked—indeed, their diet should be such as is given the young turkey. Millet seed is good also. If they are regularly fed in the poultry yard they will roost in the poultry quarters.

The guinea is more free from disease than any other kind of poultry, which is another point in their favor. Keets are often sent to market weighing less than one pound; they are then served as broilers, and their flavor is that of the partridge.

The White guinea is much the handsomer bird, and its flesh is lighter in color than the Pearl-colored, but they are not raised to any great extent in the North.

For table use the guinea should be killed when young, the weight not to exceed one and one-half pounds, and if properly dressed a good price should be realized. As the wild game is sold with the feathers on, a better appearance probably would be made by shipping the guineas in the same condition. It gives them more of a natural look, and there are always many people who judge by looks.—*Poultry Topics.*

It is very difficult to distinguish the sex in guineas, the colors being so near alike. The male has more wattles and is more mincing in his gait, as though he was walking on his toes, and is more pugnacious. Guineas prefer roosting in high trees to spending the night under cover. Their nests are made of a few small twigs put over a hollow in the ground in some secluded spot remote from human habitation. If they see a human being near the nest at any time they will desert the nest, and if the eggs are touched by the hand they will leave the nest at once. It is best when removing the eggs to use a long-handled spoon. It is always best to leave not less than five eggs in the nest, in order that the hen may continue laying in the same nest.—*Southern Cultivator.*

"City folk visiting country neighbors where guinea fowls are kept have often wondered at the cry of those pretentious creatures. Probably no other member of the feathered tribes emits a cry as exasperating to human listeners as that of the guinea fowl. The average man rarely hears it without secretly longing to throttle the throat from which it came. Yet it has its uses. Guinea fowls are the policemen of the poultry yard. They serve as guards to give other fowl warning of the approach of danger, whether it be in the form of thieves, dogs, hawks or crows. The cry of the guinea is said to be terrifying to hawks and other predatory birds, and it has prevented many a raid upon tempting flocks of poultry."

DUCKS AS MORTGAGE LIFTERS.

By Robert E. Stewart, in *Farm and Home*.

I have been breeding Indian Runner ducks on my farm for a number of years, and for a hardy, beautiful fowl they can not be beaten. The number of large white eggs which they lay seems almost unbelievable, and I have found more profit with much less expense, worry and work in breeding them than chickens.

They require a much less expensive house, and you are not bothered with lice, mites, roup, canker, bumblefoot, frozen combs, etc. After they are a few weeks old they take care of themselves. They are very small eaters, and their feed is not as expensive as for chickens.

I have always been able to dispose of the eggs in town at more money than for hen's eggs, and I now find that the hotels will pay 40 cents a dozen the year around.

An Indian Runner duck egg is as mild as a hen's egg, as white, and larger. With good care and with only enough water for them to drink, I find that they will lay from eight to nine months hand running. The Indian Runner duck is a pretty good proposition to help lift the mortgage off the farm.

DUCKS EASILY RAISED.

From *The Prairie Farmer*.

Good ducks mean good dollars. They are one of the most profitable species of birds a farmer can keep. There is much less worry in duck raising than in any other branch of poultry keeping. Ducks are hardy birds, good fatteners, and suffer little from vermin or diseases. With a moderate amount of feed and a little attention they will become profitable investments and a source of much sweet eating.

While ducks are water fowls and do not require roosting perches, they must have a comfortable, dry house. The duck house should be built on high ground, and so erected that no water can run in where the ducks may nest. The essential requirements of the house are protection from rain and snow and exclusion of fowl-eating animals. If the building is a large one, partition it into pens. The floor in every pen should be well bedded with straw or other suitable material. This bedding should be clean and be renewed frequently. Nest boxes need not be bought or made; ducks prefer to lay in the bedding on the ground.

AS TO DRINKING WATER.

There is no danger of disease if the quarters are cleaned every day and good water is kept within reach of all. A pan or small trough used for watering should be deep enough for the ducks to dip their bills into above the nostrils, otherwise their nostrils get clogged and the ducks suffer. This is all the water they need if they are market birds. Do not allow market ducks to swim. This will keep them from growing

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rapidly and retards fattening. It also tends to make the meat less tender. But gives all breeders a swimming place, preferably running water, which will not "puddle" and make the ducks "mudders."

Ducks are never troubled with lice unless housed with chickens or turkeys. They will not thrive if housed with other poultry, not even with geese. And try to provide roomy quarters, for ducks need much exercise. They are great wanderers. They lose weight if confined long in one place.

Grass is a food of which they are very fond. In the summer let the ducks have a small "run" in alfalfa or rape. During the winter provide some green relish, and, if possible, add it to a mash. Do not feed a ration of whole grain; the ducks will not do so well as upon a feed of ground grain mixed with cooked vegetables. Chopped or cracked corn is a good feed to use occasionally, but soak it thoroughly for several hours before feeding. Do not use poor, shriveled or musty grain.

PLENTY OF GRAIN.

Ducks can not digest hard grain so readily as other fowls, because they do not eat so much sharp grit. They prefer sand or coal cinders. There is not much danger of overtaxing a duck's digestion if plenty of sand and cinders are available.

Inbreeding should be carefully avoided. Better go to much trouble than run risks which inbreeding brings.

An application of lard or carbolated vaseline upon the heads once a week is good protection against gnats. Finely broken charcoal, mixed into the feeds, will serve as a good regulator for any bowel troubles.

SOME GENERAL HINTS ON DUCK RAISING.

By A. G. SYMMONDS, in *Successful Farming.*

Ducks should prove profitable on the average farm. They are easy to raise, develop fast and soon are ready for the market. There is a good profit derived from selling them for broilers, but if kept until five or six months old before selling them their feathers become quite an item.

Duck eggs may be set under hens in April or May. It takes four weeks for them to hatch. They should be sprinkled with warm water on the twenty-sixth day. When the ducklings are twenty-four hours old feed them the same as young chickens. Each hen should be given eight or ten and have a coop by herself. Feed and care for them as you would chickens. A brook, river or pond near by is an excellent thing for the ducks, but not absolutely essential.

When the ducks reach two pounds in weight or over, if it is desired to sell them as broilers, they should be confined for a week and fed all the corn-meal mash or wet cracked corn they will eat.

If one is to keep them long, plenty of range should be given them. Keep them growing until you wish to dispose of them about Thanksgiving time. Before marketing confine them one week and feed all the corn-meal mash or wet cracked corn they will eat. Darken the pen so the ducks will not take much exercise.

Ducks are more tractable than hens and more easily cared for. They

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can be tamed with a little care. Those that are kept over for breeding stock should have dry quarters, but may be allowed to run out all winter. The thick down protects them from the severe cold.

HOW TO SUCCEED WITH DUCKS.

By Anna Gallihek, in *Successful Farming.*

Those who have tried this branch of poultry raising, and failed, probably could not be convinced that ducks are easy to raise.

Perhaps it is safe to say that not more than one person in every thousand who raises poultry thoroughly understands the care of ducks. Few stay with the business long enough to learn. And yet they are easy to raise when one knows how.

The fact is, they are less difficult to raise than either chickens or turkeys. They grow faster and when properly cared for are free from disease.

It is necessary to have fresh, fertile eggs to start with. Duck eggs will not endure much rough handling. If they are shipped during hot weather there is very little chance for securing a good hatch. Besides, when a duck egg is ten days old it has reached the age limit, so far as hatching is concerned.

Duck eggs can be hatched in incubators just as well as by the ducks themselves, or by chicken hens. The eggs require four weeks to hatch, as a rule. The eggs are thin shelled and therefore very easy to test. We test all our eggs, no matter how they are being hatched. There is no excuse for allowing a hen to sit on a lot of infertile eggs for several weeks. When these are removed it gives the others a better chance. Be careful when doing the work, as it is difficult for a beginner to tell whether an egg is good or bad.

At a certain stage during incubation a perfectly good duck egg presents a rather queer appearance to the novice. When held before a strong light the shell appears to be nearly half empty. Don't get excited and throw the egg away, if you do, the chances are that you will destroy a duckling.

When incubators are used, brooders, of course, are necessary. Ducklings get along nicely in brooders, but they should only be kept there at night and at intervals during the day while they are small. All brooders should be placed in a building or under cover, for obvious reasons.

They soon outgrow a brooder, and a comfortable house is all that is necessary. If a large number are hatched, several houses are needed, because they thrive better when they are kept in flocks of thirty-five or less. When ducklings of different sizes are kept together, the smaller ones do not get a fair chance at feeding time.

Never keep ducks and other poultry together. Even two varieties of ducks will not thrive when kept together. If Pekin and Indian Runner ducklings are fed together, the latter will get very little, if any, of the feed; because, being of a timid nature, they are unable to "hold their own" among other ducks.

Don't try to raise ducklings upon whole wheat, cracked corn, or any of the so-called chick feeds. If these must be used they should be

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thoroughly cooked. A duckling does not eat enough sharp grit to grind dry grain. And don't try to force the ducks to eat more grit than they want by mixing it with the feed. This is tried sometimes with disastrous results. See that they have plenty of coarse sand right from the start, and something coarser as they grow older. There is nothing better for ducks, in the way of grit, than coal cinders.

They should have charcoal also, but it will not answer for grit. The sand and other grit should be near the feed boards or troughs, as they often stop eating to search for grit.

Oyster shell does not seem to be quite suited to their needs, but they will eat it if no other grit is provided. Young ducks, however, must have sand. They can not thrive without it. If they are without it for a time they get very weak, totter around, refuse to eat, and finally die.

Highly concentrated food is not suitable for ducks, neither young nor old. They should have plenty of green stuff along with the ground grain, although they can not live upon grass alone for any length of time. In this respect they differ from geese.

Ducklings should not be fed until they are at least twenty-four hours old. Then they should be given some dry bread, moistened with sweet skim milk or water. We always give the ducklings a drink of water (with the chill removed) soon after they are taken from the nest or incubator.

A little coarse sand is put in the water. Cooked rice in water is relished by little ducks. Raw rolled oats, moistened, will give variety to the ration also. But they should not be confined to either. A varied ration gives better results than any one kind of feed.

Growing ducks, especially Pekin, require a great deal of food. They should be fed four or five times a day. There is little danger of overtaxing the digestion of a Pekin duckling after it is five weeks old, providing they have plenty of grit and green stuff. Cooked vegetables, bran, corn meal, oat meal, middlings, etc., may all be used with enough milk or water to moisten. When ground grain is used without the cooked vegetables, something green should be added, such as chopped lettuce, dandelion, onion tops or cabbage.

Everything must be fresh; that is, the feed should not be allowed to stand from one meal to the next. Sour feed will cause convulsions. Keep everything as clean as possible. Houses should be kept clean and dry. Use plenty of litter or straw, and change often. If the ducklings are kept in yards they should be changed from one yard to another every few days. See that they have shade, and clean water to drink.

"The Indian Runner duck is not inclined to fatten so readily as other varieties. Its name originated from the fact that this duck has a running rather than a waddling motion. In color it is a light brown or fawn shade and gray. At the joining of the head and bill there is a narrow band of white. The legs are orange. In carriage it is erect, with a long, narrow body, well elevated in front, and closely feathered. The neck is long and slender, and the head rather flat. The bill is long and broad."

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SUCCESS AND FAILURE WITH DUCKS.

By Sara A. Little, in *American Poultry Advocate.*

Two flocks of Indian Runner ducklings which were in my care last summer fared so differently that I want to tell about them. They were a distinct object lesson for those who do and those who do not succeed with these much-advertised little birds. The first lot of sixty birdies were hatched last May, just before the unseasonable hot wave. They were established with four hens, each in a roomy coop, in a field where nothing could annoy them and not far from a running stream. Fresh, green grass was abundant, but natural shade was lacking. This was not given any thought, as it is rare to have too much sunshine in May in this region. Shelters were provided as protection against wind and sudden showers, as ducklings, when resting, do not care to spend all their time with their hen mothers. And I regarded these as quite adequate in the way of shade at that season. But the heat of midsummer came in May, and wholly without warning. The ducklings had not been confined with their mothers, but were allowed perfect freedom. In a very short time they quite discarded one hen, leaving the flocks too large. Had the mother been normal this would not have resulted so badly, as ducklings are less likely to crowd and smother than chickens. But the discomfort caused by the heat made the wee birds restless, and they found the stream of cold spring water too soon. The overheated little bodies were chilled, for their only covering was down, and that soon became wet and worse than no protection. As a result of these unfavorable conditions, trouble began. The wee things tipped over on their backs and could not right themselves, neither could they stay "right side up" if put on their feet. Each day witnessed the "slaughter of the innocents," and their caretaker was at her wits' end. Change of environment is recommended for many invalids, and acting on this thought, the whole outfit was moved to a new locality, where there was natural shade from trees as well as the low shade from grass and weeds. The weather moderated, too, and mortality ceased, but not until twenty promising ducklings were lost. Before the next hot wave came the survivors were strong enough to fend for themselves.

There were sixty-one hatchlings in the second flock and only the odd one, always a weakling, died. These birds were also given to four hens, but the coops were inclosed in little yards made by staking wide boards so as to make pens. Four or five twelve-foot boards were used, so the pens were good size. They were established on nice grass under the shade of trees, which were trimmed high enough so the sun found all parts of the ground at some time during the day, keeping it free from dampness, and yet there were always parts of each pen where ample shade could be found. One severely hot day, when their caretaker was unusually busy, the water pans were not filled as soon as they should have been, and two of the ducklings seemed weak and ailing when visited. Water was given at once; night came soon with cooler air, and in the

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morning they had revived and showed no signs of the neglect. Those water pans were watched more closely after that.

The food for both these flocks was substantially the same. No food was given them till they showed their need of it by restless asking. Then chick grit was added to stale bread soaked in sweet skim milk and fed sparingly. Water was supplied from the first in shallow pans, with a handful of grit in each pan. These were rendered stable by a stone in each, big enough so that the youngsters could not get into the water and get wet and could not tip the dish over. To avoid waste, the grit in each pan was rinsed when fresh water was brought, pouring off the water till all was nice and clean, but leaving the grit in the pan. After the fourth day from hatching the soaked bread was not squeezed out, but a little wheat bran was put in to absorb the moisture and vary the ration. Only a very moderate amount of food was given at once, but food was supplied about once in two hours for the first four or five days. After the first week wheat middlings in very small quantities was added to the mash, and when two weeks had been completed the soaked bread was left out and the mash consisted largely of wheat bran, twelve parts; wheat middlings, two parts; a little ground oats with hulls sifted out, and a little nice, sweet beef scrap, mixed rather soft with milk. Grit in moderate amount was added to each ration. This was varied sometimes by substituting curd from sour milk for the beef scrap. After the first two weeks the ducklings were fed five times a day and the allowance was more generous. Then at six weeks they learned to take their food three times a day like other folks, had all they would eat up clean, and grew and prospered. At eight weeks some corn meal was given to the drakes which were intended for the butcher, and at ten weeks they were turned off. This treatment was for farm ducks, with plenty of tender grass always available, so that no green stuff was needed in the ration fed them. The first flock had free range, to their sorrow, when less than one week old; the second flock was kept in the pens until four weeks old. The pens were moved to fresh grass as often as necessary. Though when the pens were moved the youngsters roamed at will, it was easy to call them back, and usually when hens adopt waterfowl they do it so thoroughly that all ducks look alike to them, so if they have their usual number of the right size they are not particular as to individuals. The mother hens were kept in coops until the ducks were liberated, when they went back to the henhouse, the ducks having no further need of them. But if the ducklings scorned their adopted mothers they never scorned their food, and from the time each flock reached full rations they never missed a feed or failed to dig for it strenuously if it was delayed, giving a funny little "hay foot, straw foot" dance around their caretaker, with eager-eyed, loud-voiced entreaty, till the food and water were supplied.

Sometimes one which had been unduly gluttonous would sit flat on the ground, resting his overful crop, but he was soon up again and on the warpath. When tired and satisfied they sat in the grass in little knots of ten or a dozen, living examples of somnolent comfort, sleeping "with one eye open," lest danger assail them.

After the first two weeks of mortality the forty which survived from

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the first flock grew as vigorously as though their lives had never been menaced, though I had feared that they might not do so. The "survival of the fittest" seemed exemplified. No accurate account of the expense for food was kept, so the cost of production is unknown. Nearly the whole flock were sold before they were old enough to lay, the drakes going largely for food, the ducks to breeders. Though the profits were certainly not very large, the lessons in caring for this branch of the poultry family which were learned are certainly worth all they cost.

Briefly, these lessons are as follows, and they apply equally to the care of all varieties of ducks: Put the newly hatched ducklings in small flocks, whether with hen or brooder. If a hen, keep her cooped, moving the coop often as long as her services are needed. Give the youngsters shaded runs which are not damp, removing to new quarters when their yards become trampled, so they may have clean grass all the time. Supply water and grit at frequent intervals until they are large enough to go to the streams. Have the water well guarded when the ducklings are small, so they may not get too wet. Let the entrances into the hen's coop be large enough so the ducklings can get in and out quickly. They grow so rapidly that it is a problem how to keep the hen in and yet admit the ducklings readily. Feed carefully the first two weeks, not starving the little fellows, but feed often rather than too much. Feed generously when old enough to endure it. Don't let them stop growing, but watch the greedy birdies carefully and control their appetites wisely. Be extremely careful in the use of corn in any way. A little is good, much is disastrous. Feed no hard grain to ducklings until past their tenth week. They may then use a little wheat and later other grains. I am not sure that the mash is not better always for a part of each day's ration. Mine have it once every day all their lives.

Ducks are wasteful eaters. A flock of chickens will find almost enough food for their needs in what the ducks have scattered.

Chick grit or coarse sand should always be found in the water pans until the ducklings wander far enough to find it in the streams. They should not find the streams or be allowed to swim until real feathers begin to grow. If they have their first swimming lesson when five or six weeks old they are not likely to suffer.

Were I limited to one variety of poultry, after breeding Indian Runner ducks for four years, I would certainly take them, discarding everything else. I like them better than chickens for various reasons. They are healthier; a low fence holds them; they do not scratch; are easily driven where wanted; do not become broody, but keep right on laying, and lay more eggs than most hens. They will lay freely for eight months, and some the other four. They lay the least while molting and in extreme winter weather. I am now, November 15, getting eggs freely from ducks hatched the middle of April. They began to lay September 1.—*A. A. Whitford, in American Poultry Advocate.*

INDIAN RUNNER DUCKS GREAT LAYERS.

By A. F. WILSON, in *Orange Judd Farmer.*

Indian Runner ducks are truly great egg machines, and are rightly named "the Leghorn of the duck family." They are small eaters, not taking more feed than our White Orpington chickens, really not as much, for they are such great foragers, and when given the range of a small tract of land, no matter how poor and weedy, they will find most of their feed.

Last summer one of our flocks of young ducks got started going to a wheat-stubble field, and each morning daylight would find them chasing grasshoppers. In about two hours they would come back and sit around until the afternoon, when they would make another trip. They would eat scarcely any feed at all. How they did grow!

The eggs are very fertile. A 90 per cent hatch is not infrequent. The young are easily reared. For the first few days we feed stale bread soaked in sweet milk, with a small per cent of fine sand mixed with it. Cottage cheese is occasionally given. After the first week we begin giving the same bran mash that we feed to our old ducks, but moistened with sweet milk. We keep plenty of water before them to dip their bills in, but not deep enough to swim in, as their feet must be kept dry.

The ducks will begin laying at four and one-half to five months of age, and will lay the year round excepting during the latter part of July and August, when they molt. This usually takes about six weeks, when they are ready for business again. This is the time of the year we pick them, as they would lose the feathers anyway. They do not require an expensive house, just a good shelter and protection from winds and storms. A good litter of straw should be provided for their bedding. Dry-goods boxes turned upside down with a hole cut in one side will provide the nests. Some eggs are usually deposited around in the straw, but it is not uncommon to get from twenty to thirty eggs in one nest.

Duck eggs for culinary use do not command a ready sale. There is an impression that they are strong in flavor, and this no doubt is true where ducks are fed fish or gather wild herbs, plants, etc. But when the food is composed of good, sound grain, pure meat scrap, and choice green stuff, there is not a particle of taint to the flavor of the eggs. Food has everything to do with it.—*Michael K. Boyer, in American Poultry Advocate.*

"The market term 'green duck' is of late innovation. The cognomen is applied for the reason that the bird has not yet matured. It should weigh not less than four pounds, and be not over ten weeks old—eight weeks would be better—and should never be allowed bathing water. As an article of diet, if provided by a competent chef, the green duck resembles the famous and fast-disappearing canvas-back duck."

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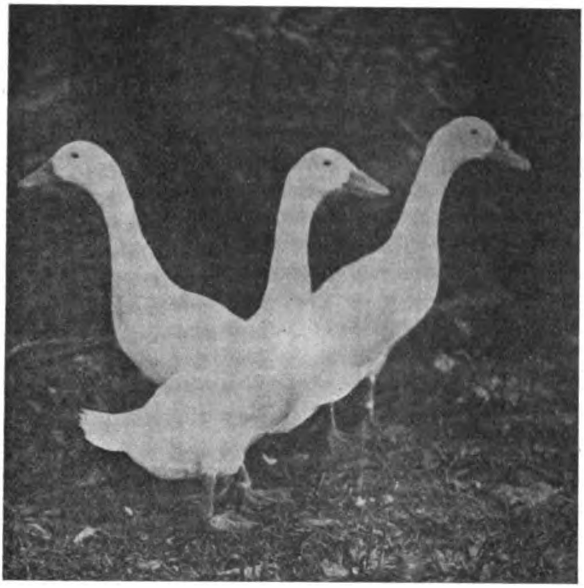

White Indian Runner ducks.

KEEPING INDIAN RUNNER DUCKS.

By W. E. Leighty, in *Successful Poultry Journal.*

Before telling you the method of keeping and raising Indian Runner ducks, I will give a brief description of these wonderful egg machines.

This family of water fowl is credited with originating in India, and is thought to have derived the name Runner from its habit of running, and it is a very handsome and stylish bird of erect carriage. With proper care they lay early and lots of eggs. They outlay all water fowls. The first laying season they should average 175 to 190 eggs each, and for the following six or seven years should do much better. These ducks are known as the "Leghorn" of the duck family, on account of their great laying

The Indian Runner duck does not find water essential to a successful life, except for drinking purposes, as they will only take about two plunges a day; their greater time being taken up in foraging.

Their upright carriage and peculiar running gate enables them to forage far and wide, and they will pick up half their living this way. They are full grown in from eight to ten weeks. Get a start and you will always keep them.

In incubating the eggs carry the temperature as near 103 as possible all through the hatch; also see that there is proper moisture applied to your machine. To get the proper moisture in hatching duck eggs is one of the greatest troubles experienced. The last few days of incubating the eggs should be sprinkled with water at about 90 degrees temperature, whether hatched in an incubator or by hens. Don't get in a hurry when the hatch is coming off if some of the ducklings do not come out at once. It takes sometimes one to two days for some of them to get out, but this does not matter, as they will be just the same as the others.

Do not feed the ducklings until they are about forty-eight hours old, when they first should be given all the water they will drink. Their food should be given them about five times a day, and not too much. The first feed is a mash consisting of four parts bran and two parts corn meal sprinkled with sand. It is a good thing to keep sand before them always. When they are about ten days old the corn meal can be increased in amount until it is about half and half corn meal and bran. Beef scrap given them after they are about two weeks old is a good thing. Do not give any green feed until they are about two weeks old. When they have reached this age only feed about three times a day.

Care should be taken in order to have proper and dry quarters, as this is the most important thing in raising ducks, leg weakness being the result of damp quarters. Ducklings should not be allowed to have access to water except for drinking purposes until they are well feathered.

FEED AND CARE OF DUCKS.

From *Poultry*.

All sorts of mixtures and all kinds of fussing have been recommended in feeding young ducks in times past. The biggest and best breeders of the present day, however, do very little fussing, and the food mixtures are of the plainest kind. I have found a mixture of two-thirds wheat bran and one-third corn meal, with a handful of fine gravel or coarse sand mixed in, for the first two or three days, sufficient for all their needs. If skim or whole milk is easy to get, it may be used to moisten this mixture to a crumbly consistency; otherwise either hot or cold water will answer. I frequently break raw eggs into the meal, in the proportion of two eggs to one quart of the dry grain. This must be thoroughly mixed in order that it may not be too pasty or sticky. After the first three days I omit the sand or gravel, and by the fifth day begin to feed a slight proportion of beef scraps. This proportion may be gradually increased until at two weeks old they are getting five per cent of the beef scrap; at three weeks old their food should be one-half bran, one-half corn meal, and about seven per cent of the whole mixture beef scraps. Gradually increase the animal matter until at five weeks they are having fifteen per cent. This proportion may be carried until killing time, which under ordinary conditions should be at ten weeks, when they should weigh from ten to twelve pounds per pair.

Early hatched ducklings should have brooder heat for practically the whole ten weeks. At least they will require houses that are slightly warmed, even after feathering, or too much of the food consumed will have to go toward making heat instead of flesh. After the warm spring

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months come the birds will require less heat, and after the first of May probably fourteen to twenty days will be all the hover heat they will need. After that time a house dry and free from draughts will meet every requirement. It must be kept sweet and clean, however, and it becomes necessary to keep continually at the cleaning.

Dry planer shavings make the best litter for the floor for both old and young stock. Sawdust is fairly good, but mixes too readily with the food of the young birds. Straw and gravel are both bad, as they become wet quickly and are slow to dry. Whatever the material used, it must be kept dry or disaster will follow. Keep drinking water, grit and shells by the young birds at all hours. Have the water supply so that they can get it night and day. This will save undue thirst and the loss of many of the birds by tramping and wetting, which comes after being shut away from the water for any length of time. Standing in a brooder building any moonlight night one can see a constant procession of little birds going to and from the water fountain, and this in itself is proof of the need of it being there.

GROWING DUCKS FOR MARKET.

From *Illinois Farmers' Institute Bulletin.*

There is probably no branch of the poultry industry which receives so little attention on farms as that of growing ducks for market. Probably this is due to the erroneous idea that "ducks eat more than they are worth," and the farmer is, as a result, opposed to having them on the place. It is admitted that the duck is a hearty feeder, but we can not form any definite conclusion as to profit or loss in growing ducks until we figure the actual cost of production and the amount realized for the finished product.

The first necessary factor in profitable duck growing is a good market. In the second place, the greatest success comes from marketing the ducks when they are about ten weeks old. The idea is to hatch, raise and get them on the market as quickly as possible. Up to ten weeks from its hatch a duck will make the most economical gains, while as it grows older the gains, in proportion to food consumed, show a decided falling off. Very little difficulty is experienced with vermin of any kind, and the fowls are usually healthful if properly housed and fed.

The natural laying period for ducks is the early spring months, but by certain methods of feeding eggs may be secured at any time of year. They can be hatched by either natural or artificial means. Hens are more commonly used on the ordinary farms and are quite satisfactory.

The first feed for ducklings is made of equal parts of bran, corn meal and shorts, to which is added 5 per cent of beef scrap. It is fed moistened, five times a day, all they will eat, for the first three weeks, and after that only three times a day. Some grit or sharp sand is added to this mash occasionally. From the very first some green food should be cut up fine and mixed with it, gradually increasing the quantity until half the bulk is green food. An abundance of good, clean drinking water must be provided, but a pond of running water is not at all necessary, as ducks can be grown just as well without it. Plenty of shade should be provided, as ducks can not stand the hot rays of the sun.

Judicious feeding and forcing will bring ducks to weigh from eight to twelve pounds per pair at ten weeks of age. Probably the Indian Runner is the best breed to raise, as they are good layers, producing a white, mild-flavored egg, and the ducklings make rapid and economical gains.

It is generally supposed that more grain is required to grow a pound of duck than to produce a pound of chicken, but this is not the case, as carefully conducted experiments show that it takes from 3.25 pounds to 3.75 pounds of grain to produce one pound of chicken, whereas it takes only about 3.15 pounds of grain to produce one pound of duck.

In a 1911 experiment 15 Runner ducks were hatched May 2, and 15 on May 6. At ten weeks of age they were marketed, weighing 128 pounds, and brought 20 cents a pound. They had been fed 403 pounds of material valued at 2 cents a pound, making the cost of one pound of duck 6.3 cents. Add to this the cost of labor, etc., and the net cost per pound is not more than 10 cents, leaving a net profit of 10 cents a pound.

We do not advocate extensive duck growing for the average farmer, but we do say that 50 to 100 ducks can be raised annually on almost every farm at a handsome profit.

FEEDING THE MARKET DUCK.

From *Orange Judd Farmer.*

Much of the success in duck raising lies in the method of feeding. From the very start the ducklings must be properly fed or they will likely be undeveloped, or may suffer from checks in development. In either case care and feeding in their later days will not be as effective as if everything has gone smoothly from the first.

At all times the ducklings need plenty of water for drinking, but must never have more than enough to wet their bills as long as they are in the down stage of development. It is not necessary, even after they have passed this stage, to have water in which to swim. Indeed, most market duck growers raise their ducklings without the use of swimming pools or streams at all.

One prominent commercial duck grower buys stale baker's bread, which he uses either in conjunction with or instead of bran, mixed with milk which has not become very sour, but which can be bought for a cent a quart. At no time does he allow the ducklings to drink milk, because they smear themselves all over with it and their eyes and beaks often become clogged with it, and sometimes the down on their bodies will peel off in great patches. The only safe way to feed milk to ducklings is in a mash.

In order to have ducklings make a natural and normal development, accompanying mixtures are fed at various times. These mixtures are all made crumbly—moist, but not pasty. The proportions mentioned are by measure, not weight.

During the first four days a mixture of four parts of wheat bran, one part each of corn meal and low-grade flour, and 5 per cent of fine grit, is fed four times daily. At no time is more given than the ducklings will eat up clean. Then the following mixture is fed until the ducklings are four weeks old: Four parts of wheat bran, one part each of corn meal and low-grade flour, 3 per cent of fine grit, 5 per cent of fine-ground beef scrap soaked, and plenty of cut green clover, cabbage or rye. Both the mash and the green feed are fed four times daily.

For the next four weeks the mixture consists of three parts of wheat bran, one part each of corn meal and low-grade flour, 5 per cent of fine grit and also of beef scrap, 1 per cent fine oyster shells, and as much finely chopped green stuff as the ducklings have been eating before; this green stuff mixed in with the meal instead of being fed separately. This mixture is fed four times a day.

Often this mixture is changed when the ducklings are six weeks old, though usually not until eight weeks old, when the following mixture is fed: Equal parts of corn meal and wheat bran, 15 per cent of low-grade flour, 10 per cent each of beef scrap and green food, 3 per cent grit. This feed is given three times a day.

When eight to ten weeks old, the feed consists of one-half corn meal, equal parts of wheat bran and low-grade flour, 10 per cent of beef scrap, 3 per cent of grit, 1 per cent of oyster shells, and not more than 10 per cent of green food three times a day. Between the ages of eight and ten weeks the ducks should be ready for market. They should be killed and dressed before they begin to develop their second coat of feathers, because the development of these feathers not only makes a drain upon the system but it fills the skin with pinfeathers.

"A combination of dry picking and scalding is used for ducks. After they have been stuck behind the ear lobes, and the neck broken as in chickens, the neck is bent backward and with the wings is hung over the edge of a barrel, while the body of the bird hangs on the inside. The down on the breast is picked off and dropped into the barrel. The birds are then thrown on the floor until life is entirely extinct; then powdered resin is dusted into the feathers and the duck scalded in the usual way. The resin dissolves as soon as it strikes the hot water, but adheres to the feathers, and when cooled by exposure to the air, it glues them together in such a fashion that down, pin feathers and all peel off in a single mass. The order of removing the feathers is as follows: First they are pulled off the neck and the two wings; with the breast of the duck up and head toward you, with the thumbs the feathery mass over the keel bone from head to tail is next separated, so that the entire breast is exposed. The carcass is now turned to the left, and the feathers worked off toward the right in a mass until all are removed. As is also the case with chickens, any feathers that remain should be rubbed off rather than picked. A duck is plumped and cooled in exactly the same fashion as a chicken."

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GOOSE CULTURE PROFITABLE.

By J. C. Clipp, in *Poultry.*

When any business nets the owner 100 per cent profit it certainly is good. No one can complain of a profit of 100 per cent. We have been in the goose business more or less for over twenty years, and we find that geese come as near paying a profit of 100 per cent as any fowl we ever raised. There is "big money" in growing geese. Sheep men tell us that they grow sheep because they pay a double profit, realizing for them more clear money than any other stock grown on the farm, when the amount of money invested is considered; but geese pay a triple profit.

Many people in this country believe that geese are a nuisance. Geese, if not properly handled, are a nuisance, just the same as any other live stock which has not or does not receive the proper management. What would you expect from a herd of cattle if they were not confined to their respective quarters? The same with hogs, etc. When geese are permitted to run at will with the chickens in the truck patch they certainly are a grand nuisance.

In every instance when you hear a man denouncing geese you can safely say he has at some time neglected them, or is simply denouncing them for argument's sake. Geese when given proper care and attention and confined to their own quarters, handled as you would other live stock, are indeed very profitable; in fact, almost as profitable as turkeys. I have frequently made the assertion that where geese receive anything like proper attention they are at least fifty per cent more profitable than hogs.

Did you ever think of the vast amount of grain required to get a porker ready for market? You could handle a large number of geese on the same amount of grain required for one porker, and profits would be more than double. While it is a fact the sheep man gets a double profit from his flock of sheep, from the lambs and wool, the goose farmer realizes a triple profit from his flock of geese—from the goslings, eggs and feathers. Where a flock of well-bred geese is grown the profits are great, and we see no good reason why every farmer does not cater to this industry. Some few months ago the writer visited a large number of poultry farmers and poultry fanciers, and learned from every one who was breeding geese that the best money they made was from them.

Goose farmers who had range fed very little except during the breeding season, and then only a light ration of corn, wheat bran and shorts, allowing them to live largely upon grass.

You know we travel this way but once, and since a nice, clean living can be made from geese, we might just as well grow a few hundred each year and invest the proceeds in an automobile. The automobile has gained great favor among the American people and has become a necessity in a measure, still a luxury to some degree. We can easily obtain them by growing a fine flock of waterfowls. I don't know of anything that

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would make it more possible than the growing of geese. Thousands of dollars are being lost each year by farmers who are not giving more attention to this branch of poultry keeping.

It is not our intention to devote all our remarks to urge you to breed geese and not tell you the best methods of handling them for the best results. Yet we wish to say enough to convince you that goose farming is one of the very best features of the poultry side of farming.

To make a success of goose farming I would select one of the large varieties of geese—either Toulouse, Embden or African. The Toulouse is the largest of the goose family, and most popular, easily raised, and mature very early, making them very popular with the majority of growers. The other two varieties are very popular, and command good prices both in market and when bred for exhibition. The Toulouse are very popular, due to their great size, and if you take up the breeding of those you will always have a good demand for both the stock and eggs. Keep what the trade demands, and you are almost sure of meeting with success so far as disposing of them is concerned. But growing and selling are two different things. It is one thing to grow geese and quite another thing to sell them. While it is an easy matter to grow geese, there are a few things which must be observed to successfully mature them. Last season we lost quite a number of goslings, all in one week's time, by allowing them to find their way to a stream of water that was infested with large turtles. Goslings must be kept away from such dangers and from swine. Hogs will eat up goslings faster than ten incubators or one hundred hens could hatch them. Keep young goslings confined in a convenient pasture where there is plenty of short grass—a field free from ponds or running streams preferred—and feed them, while "downy," two-thirds corn meal and one-third shorts or wheat bran. If goslings have plenty of water to drink and grass they will thrive without meat scraps, but the meat pushes them along more rapidly. Give the corn meal and wheat middlings three times daily, just what they will eat up, until they are feathered, and then a feed of corn or wheat at night will be sufficient. Geese live principally upon grass, and feeding is not so necessary as with other fowls. You will find goose culture both a pleasure and a profit.

The fact that geese are becoming more and more in favor with the average American was plainly shown us during the past week. We had the pleasure of visiting a very successful Toulouse goose breeder, and found that he was not only growing geese of the finest quality, but was having a demand for eggs far beyond his supply. He says, "Geese would have to lay equal to Leghorns if I should any ways near be able to supply the demand." When showing us through the gosling parks I asked how he managed and fed his goslings. To my surprise he said: "Well, you see, those parks are amply supplied with grass and water, and that is all there is to it. In fact, I have not fed my geese and goslings $5 worth of food this spring. They are the nearest self-supporting of any fowl or animal I have ever kept on a farm. They are no expense to me at all, you might say, and that's why I like them so well. They are no bother, never get out; this eighteen-inch fence confines them perfectly; and people are getting onto these facts and are growing more geese every year."

These statements are exactly in harmony with our experience with geese. They are no expense at all if you have grass, and to have a goose or gosling sick is simply unknown to us. I believe if growers watch their breeding closely and avoid so much inbreeding, goose farming will largely take the place of all other fowls on the farm. What I mean by this is, goose culture will be the leading fowl industry. Of course chickens of the various varieties will always be popular, but turkeys and ducks will give way to geese largely with many farmers, because they are so little expense and trouble. The writer has grown geese more or less for more than twenty years, and I never experienced a sick goose or gosling in my life. I can not say that of turkeys or chickens. Not a breeder in this country can truthfully say that he never had a sick fowl if he has bred chickens or turkeys two years. Geese always demand a ready market at good prices. One of our farmers in this country marketed over seventy-five head last season, which brought him a neat sum of money after producing many pounds of feathers, worth anywhere from forty to sixty cents per pound.

Several amateur growers sent us orders this spring for eggs, stating that if we could not fill their orders early to return their money. Such growers were evidently under the wrong impression, as geese hatched in April and May do much better than those hatched in early March. The later-hatched goslings do not require nearly so much food, as grass is their natural ration and can not be obtained early. Goslings hatched in April will make quite as large geese as those hatched in March. We received eggs in February, but refused to ship goose eggs so early, as they are not so apt to be fertile. Goose eggs, as a rule, run rather low in fertility. Just why this is true we never could tell, but rather attributed the cause to more or less inbreeding. Geese are more closely inbred than any other fowls, possibly because they are so hardy and can stand more inbreeding than any other fowl. Swimming water is unnecessary for goslings. We have a fine clutch of goslings almost feathered that never saw swimming water. Only enough water for them to drink is all they have ever received, and I do not believe a more choice flock of youngsters lives. We have provided them constantly all the grit and charcoal they desired. I am of the opinion that geese never receive half enough charcoal as a rule. I am confident our geese have eaten daily a half-pound of charcoal each, and it appears to be one of the greatest vigor builders it is possible to give them; in fact, charcoal is simply grand for fowls of every description. The secret of success in the goose business is to avoid inbreeding, in order to have your eggs fertile. If you can get your eggs to hatch you will have no further trouble, as the goslings will grow like weeds when once hatched. Very frequently a grower will set several eggs and not have an egg hatch. This is discouraging, of course, but to overcome this evil arrange to obtain new males at least every third year, and do not breed from overfat specimens. Remember that geese are as easily fattened as a Poland China pig and overfat geese are worthless for fertile eggs. Dur-

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ing the breeding season we feed but very little corn, only a small ration of wheat, with an occasional mash made of wheat bran and corn meal mixed with milk. If your geese have plenty of range and grass you will find they will require but little food. This food proposition is the great saving in raising geese. You are out nothing, and at times you receive a double income in shape of feathers and stock.

L. M. Cox, in *Farmers' Guide:* No fowl on the farm takes as little care or is of greater profit than the goose. Some may think this a bold statement, but I had rather raise one hundred goslings than that many chickens. It takes less work and they are just as profitable in the end.

When the little goslings are hatched I do not allow them to have anything to eat or drink for forty-eight hours after they are hatched. Then a little sprig of tender grass is given them and water only for them to get their bills in. Too much water for a little gosling is as injurious as it is for little chicks. The third day I give them some well-cooked corn bread, salted and made with buttermilk and soda, with meat scraps mixed in it. A little gosling is pretty hard to teach to eat corn bread or other feeds, as its nature is to eat grass. An old hen for a mother teaches them to eat more readily than a goose. But there is danger of head lice on the goslings with a hen mother. They then have to be watched very closely, as they soon begin to dwindle and die.

As soon as the little goslings begin to grow, they are very little trouble. Keep them away from water, ponds or streams. Give them water for drinking in shallow vessels, with clean rocks in the vessels, so that they may drink without getting wet. I feed them corn bread on loose gravel or grit that I keep before them, so that they may have plenty of grit. I also see that they have plenty of charcoal. I let them have a range where they may wander at will and have plenty of grass. The mother goose or hen I keep tied, as they wander around and do not give the goslings enough rest. I keep the goose tied until the goslings are three or four weeks old.

It is a great pleasure to watch them grow and change their down into feathers. As soon as the wing feathers have grown so that they cross over the back the goslings are ready to pick for the first time. Each seven weeks after that we pick the geese, both summer and winter. In winter we are very careful about picking them on cold days. If it seems as though it will be too cold for them we keep them in a closed building and feed them well.

Considering the little care it takes for a gosling after it is two weeks old, the small amount of grain it takes to feed a goose, and that they live on grass when it can be had, and the many, many pounds of feathers that can be gotten from them during the year and sold at a good price, also the good market for geese at Thanksgiving and Christmas, they are surely profitable. Then there is the large number of eggs that are obtained from them during the spring months, which is another source of income. I do not think any one will doubt that the goose is the most profitable fowl that the farm produces.

We keep the Embden geese, and our drove of sixty-five white ones is a beautiful sight when they are full feathered.

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SOME GOOSE OBSERVATIONS.

By J. C. CLIPP, in *Farmers' Guide.*

Geese are very profitable, for the reason that they are almost entirely self-supporting. Grass is their natural ration. If goslings can have access to a thrifty grass plat they will require but little food. We have given goslings food, and to our surprise they would leave it and eat grass, preferring it to the feed given them.

Goslings are very affectionate and are always ready to meet you. Some may get the idea that they will not require any care whatever, but this is a mistake. They do not require as great amount of food as other poultry, but they must be provided with plenty of green feed. If range is limited and grass scarce, sow a yard with oats or rye and you will find they will make the greatest growth possible. A rich clover field makes an ideal grazing place for goslings and geese. Ours have access to a clover field, and I find they require but little grain except during snowy weather.

You can easily overfeed goslings, and when you get them overfat you are almost sure to lose more or less of them. If you provide limited quarters and feed freely on mash feeds, you are sure to overfeed. They die very quickly from overfat, especially if they do not have shade. We lost five last season from sunstroke. They were too fat, due to feeding in the duck quarters. This year we shall use special precaution in preventing the goslings feeding with the ducks. One duckling will eat almost as much food as ten goslings will. I never raised any fowl that was as little expense to raise, unless it is turkeys, for they are almost self-supporting. When you have grass and water for goslings, nature provides the rest. During the laying season we feed our geese wheat and oats in the morning, with a small feed of corn at night. Frequently when we feed them corn they will leave it and return to pasture.

There are many things to learn about goose raising that are learned only by experience. Things that are important when told to the novice are only minor things later on. For instance, we say keep away from a large body of water, and this would be ignored by many amateur goose raisers. The majority suppose such natural equipment in favor of goose farming, and not until forty or fifty promising goslings are devoured by turtles or muskrats can they fully realize the importance of such advice. The stream is all right after they are raised, but all wrong for the young and "green" geese. Much better success may be had with goslings and ducklings if they are not allowed excessive water. Never allow them the stream unless you can accompany them and bring them in after a good bath. We take our ducks and geese to the branch once or twice a week when young, as they do better with an occasional bath. After goslings have once found the water they must be kept penned away, as it is natural for them to desire another swim.

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BREEDING AND RAISING GEESE.

By Mrs. B. F. Hislop, in *Farm and Home.*

All dwellers on farms, as well as many in small towns and suburbs, are interested in fowls of some kind. Chickens are the favorite, to be sure, but on the farm, or any place where there is pasture, geese may be profitably reared.

If they are permitted to run at large without any restrictions, they are a nuisance; so is a pig. Any fence that will "hold pigs," so to speak, will confine geese, especially the large varieties. They do not think of flying over a fence, nor will they make any great effort to find a place to get through, unless separated from their mates or removed to new grounds.

FEEDING THE BREEDERS.

As the breeding of any kind of stock is carried on with the object of profit, the goose breeder should select the largest variety and breed to secure the heaviest stock obtainable, as the heavier geese always command the best price. In the first place, get good, well-bred stock. If you do not expect to cater to the fancy, you need not necessarily have exhibition birds, just vigorous, good-sized birds. If you are an amateur, get a trio—one male and two adult females—if convenient, as young ones are not good breeders the first year. Get your geese early in the winter, if possible, not later than February 15.

Feed them a little corn and oats and let run where there is clover or fodder, if convenient, or range on a pasture, as geese are regular foragers and need something besides grain. It is well to feed them vegetables of some kind. They will relish almost anything in that line. By all means let them run on grass as early as possible.

The gander becomes very thin during the breeding season and remains so till the frosts come; the female gets thin after the laying season. Remember geese are regular topers, and must have drink at all times; but as for swimming, that is n't necessary, although they enjoy it.

Prepare some straw for nesting in a dry place, if possible, as the female not only buries her eggs, but she will roll them around in the mud till they look like huge balls of mud. Gather the eggs as soon after they are laid as possible and set on end in a cool—not cold—place till wanted.

Set them under a chicken hen, five to seven eggs, depending on size. The heavier the hen the better, and set on the ground if convenient. The eggs hatch in twenty-eight to thirty days and pip twenty-four hours before hatching, so don't pick the gosling out for fear it can't get out itself. It seldom needs any help. If it really does it may not amount to much.

NO LOSS WITH THE GOSLINGS.

The gosling is most sure to live and thrive if it gets out of the shell all right. I can't say sure about a chicken or a turkey—and I've raised hundreds of them, and lost lots of them, too—but when I had a gosling I

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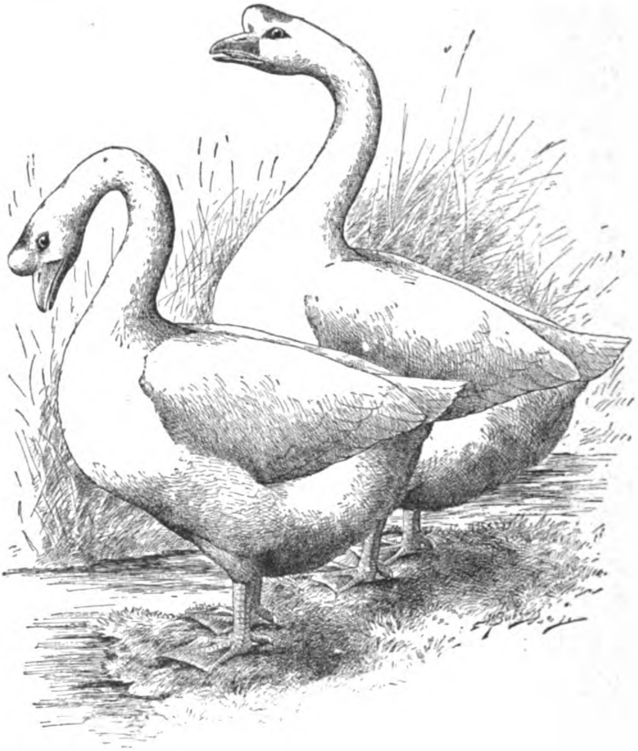
counted on an adult bird and was seldom disappointed. As soon as all are hatched and straightened up—say twenty-four hours old—put them and the hen mother in a warm coop, on short, tender grass, letting goslings run out, but keep the hen slatted in.

Feed the chicks mash of some kind, or make a mash of fine corn meal and middlings, mixed with milk or water. Feed on a board three or four times a day while young. Give water to drink, but not to swim in. Use a tank or fix a vessel so they can't get in to paddle or swim, especially early in the season while it is cold and chilly. Remember a young gosling can't stand any more cold or wet than a young chicken, but when old enough to have feathers instead of down they can stand almost any kind of weather.



A pair of White Chinese Geese.

At first they are very dainty eaters, but after about ten days they come to their appetites in fine shape. Oh, they eat, but don't they grow! You will never begrudge them a morsel, but will be delighted to see them eat. As soon as the goslings can get about well, turn the hen loose with them, but see they spend a goodly share of the time on the grass. The goslings will do this as a rule, as the hen follows them, not they the hen. As the goslings grow older the grain food can be coarser and fed only

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twice a day, but even if there is plenty of green forage don't neglect the grain, as it pays to push the young stock.

Our Toulouse by Christmas weigh eighteen to twenty-two pounds each for females, and males twenty to twenty-five pounds. Geese should be marketed from Thanksgiving to January. If winter is severe and there is much snow, they will hold flesh till middle of January, but no amount of feeding can keep top weight at any other season of the year.

FINISHING FOR THE MARKET.

When weather gets cold in the fall geese become heavy eaters, and if intended for market feed plenty of corn—mash in morning, whole grain at night. Do not permit swimming, as this will keep them thin. It is best not to have too large a range.

An adult during the summer does not eat much. Forage and a very little grain will keep them in good health. They need no housing, and only a shed for protection during the winter and shade in summer, as well as plenty of drinking water.

After the laying season the female, if not permitted to set (as a rule she is a very poor mother), will lay three clutches of eggs. The last clutch is very infertile, and it is hardly worth while to set them. While laying she will furnish an egg about every 36 hours. Do not feed too heavy to get eggs; you can in this way get more in number, but you lose out on the hatching qualities.

PLUCKING THE FEATHERS.

As soon as the laying season is over the geese may be plucked, and again as often as feathers are "ripe" till fall. The growing of feathers depends on feed and care. If food is scanty feathers will grow slower. The breasts of goslings are all that should be plucked, and only once unless very early hatched. Some people pluck them the same as old birds, but it is hard on them, and unless extra feed and care is given it dwarfs them.

It is cruel to pluck the birds late in the season, but it does n't hurt them at all early, as they'd molt the feathers anyhow. Feathers to be ripe must be free from blood in the quills. If they are not, they will not be a good grade and will cause pain and injury to the bird in plucking.

To cure, put the feathers in cheap muslin sacks and hang in an airy place. A little sunning will not hurt, but do not expose them too long to the hot sun. In about three months they are ready for use.

HOW TO DRESS GEESE.

To dress geese for market, kill as other poultry, by severing an artery through the mouth; then dry pick at once. After the feathers and down are removed as well as one conveniently can, arrange a box or large pan with pulverized rosin in it. Put the goose into this and rub the rosin over it with the hand. There will no doubt be enough down left to hold plenty of rosin. Then plunge into boiling water; take the bird out and lay it on a table and rub well with the hand. The rosin sticks to the down and it can be rubbed off nicely. Of course do not scald the head and feet, but hold them in the hands while immersing the goose.

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The tip or first joint of the wing may be cut off, as it is almost impossible to get the quills out. After the down is off dip the bird into hot water again, then in cold water; wipe and hang up to cool. Leave the feathers on the head and part of the neck. When cold, but not frozen, pack in barrels or boxes, the same as chickens, and they are ready to ship.

CARE AND MANAGEMENT OF GEESE.

From *Farmer and Breeder.*

Wherever cattle, sheep or hog raising can be made profitable, the rearing of geese may be undertaken successfully. The main requisites for goose culture are green pasture, pure water to drink, and corn for fattening. The old notion that geese could not be reared readily without running water has been disproved. Indeed it seems from investigations made by several large goose farmers that the birds which have clean, fresh water in clean troughs are more thrifty than those that have the run of a place where mudholes exist for them to paddle in. A large stream is very gratefully accepted by the geese themselves, but such a stream usually harbors a lot of vermin to get away with the young geese.

Where any considerable number of geese are raised on a farm they should be fenced in the pasture like hogs, common hog fencing being as effective for geese as for hogs. Indeed, if your hog pasture is large enough, and there is no danger of the hogs killing the geese, they may pasture on the same ground. If your geese have access to the barnyards and cattle sheds there is usually no need of further feed being furnished them. Geese are great foragers, and good, fresh grass or clover and alfalfa pasture, with fresh water, will furnish all the sustenance they need during spring, summer and fall. In winter you must furnish clover or alfalfa hay, with a little corn if they can not pick it up for themselves in the feeding lots.

The goslings are best started on fresh, tender grass, onion tops and a very little finely cracked, dry corn. If they are hatched too early to find bugs, a little fresh, clean beef scrap may be fed each day. When well started and able to run about freely, the goslings take care of their own food problem till frost cuts the green forage low. Then you can gather up the young stock, separate the birds intended for breeding purposes, and place the remainder in close confinement to be fattened for the holiday markets. Corn, skim milk and alfalfa hay make an ideal ration for fattening market geese.

There are two principal breeds of geese reared in this country, in addition to the mongrel barnyard geese, which do not seem to be a special breed. These mongrel geese, as far as we have ever seen, usually have gray heads, the back of the wings is gray, and the tail is gray, shading to white underneath the body. Other geese in some flocks are spotted white and gray, and the spots are nearly always on the same places on each goose. The ganders are always white; consequently there is never any trouble in telling sex among them.

The Toulouse geese are very much like the old gray geese in appearance, but in color both male and female are alike; they are dark gray on head, neck, back and wings, shaded to white underneath. The bill and feet are of a dark orange color. The females weigh from eighteen to twenty-two pounds, and the ganders from twenty-three to thirty pounds, twenty-three pounds being a good, fair weight for farm birds.

The Embden geese, both males and females, are pure white. They have a flesh-colored beak and orange legs. They are about the same size as the Toulouse. The white feathers are one point in their favor over the gray.

It is often stated that the income from the feathers will pay for the keeping of geese, and that the market birds yield the profit. Mature geese are picked four times in a season, and yield about a pound of soft feathers to six geese at a picking. Feathers (live-geese feathers) are quoted at $1 to $1.25 per pound in the city markets. Thus six geese should yield about $5 a season in feathers, in addition to rearing a nice flock of goslings for the market. You may pick the ganders in early May, but the females should never be picked till they stop laying, which will not be till late in June. In that case the females will yield but two pickings in a season. Your geese will do better if paired two and two throughout the flock. When only five or six geese are kept one gander may serve four or five geese, but if a second gander is introduced in the flock they will then pair off, leaving two or three geese to lay infertile eggs.

A goose will lay from about the first of February till July if she is not allowed to sit. They are apt to deposit their eggs about the barnyard in manure piles, straw stacks or any convenient place, covering them from sight; thus many eggs are often lost or frozen. For this reason it is important that laying geese be confined in an inclosure till noon during the laying season in order to obtain their eggs. They will lay about fifteen or eighteen eggs apiece and then feather the nest for sitting. The best geese farmers do not allow their geese to sit, but place the eggs in an incubator or under hens, compelling the geese to go on laying after a suitable rest. Whether you hatch the eggs in incubators or under hens, the chicken hens make the best mothers for young geese. Each hen will mother twelve young geese nicely, although she can cover not more than seven of the big eggs while hatching. It takes thirty days for geese to hatch, and the eggs should be dipped in warm water about twice a week during incubation, unless the weather is extremely damp. In the incubator this is important.

As we said earlier in this article, little goslings need nothing better than fresh green grass for their first feed. Sprouted oats, fresh sod sprouted in the cellar, and green onion tops may be supplied for early geese which come before grass has started. If there is an extra gander on the place he will always attach himself to the hens which are rearing the goslings, and he makes a capital defender for the flock. When the hen mother weans and forsakes her charges she will lead them to the old flock, which at once undertakes to finish their education from where the hen left off.

Hens with goslings should be cooped in a large, airy, dry coop, and have a run fenced off to confine the goslings for a week or so; otherwise they are apt to stray away from her. The old flock of geese must not be

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allowed to come near the young ones, or they will try to coax them away. Young goslings should not be allowed to go near water or become wet until they are feathered. They should have drinking water furnished in little fountains which they can not get into. A hundred young geese ought easily to be reared from nine to ten pairs in a season.

Geese sell at holiday time at 12 to 15 cents a pound. A young goose nicely fattened brings about $2, sometimes more. This, with the income from the feathers, makes a nice little side line on any fruit, dairy or stock farm. Geese remain good breeders till twelve or fifteen years old, but the eggs of a young goose are worthless for hatching the first season. They may be used boiled for feeding the young goslings, to take the place of insects and bugs when the little fellows are penned. The ganders should be renewed every five or six years, as an old gander gets to be a formidable foe.

In winter you will need a low shed for your breeding stock. Make it about six by ten or twelve feet in size, with the roof sloping towards the south. Have it as low as convenient for you to get about in attending to the cleaning. No perches are needed for geese; they should simply be bedded down like hogs, with clean straw. The only fixtures needed are a manger for hay in the front end, and a vessel for water. If they are fed corn it should be given on the ear and the ears charred once a week. Half the front of the shed may be enclosed with boards and contain a sash of window lights. In this end they should be bedded. Geese may have their liberty all winter unless it should be unusually stormy for a day or so. If they are fed nothing but clean, sweet hay, bright, sound corn, and pure water, and their quarters are dry and clean, they very rarely suffer from disease of any kind. For this reason, and because of their habit of doing their own foraging for food in summer, they make infinitely less work than a flock of hens. They ought to be raised more freely on our large farms. Geese are usually sold alive on the market, but if you once learn the secret of quick dressing and careful packing for market you will do the work on the farm and have the feathers, down, etc., for your own.

A. F. S., in *The Wisconsin Farmer:* Geese are probably the hardiest of all domestic fowls. They require less attention and little or no outlay for buildings. The two great objections to geese are the noise they make and the fact that they spoil a pasture for other stock. Cattle or sheep do not like to graze where geese have been. Yet there should be a place for them on many more farms than they now occupy. Under the right conditions geese give better returns than any other poultry, but if you do not understand their nature and don't know how to care for them they are the least profitable of all stock. By nature geese are more like a sheep or cow in habit of feeding than like poultry. They are essentially grazing animals, and too much grain will spoil them. Pure air is of even more importance to geese than to cattle. They will not thrive if shut up in buildings. If you have not a good pasture do not try to keep geese, or, at least, raise many goslings. They can, however, be kept in yards if fed an abundance of fodder corn, green rape, clover or other green feed, but this adds greatly to the expense.

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While green pasture is important for maintaining old geese, it is indispensable food for young goslings. They must have fresh, tender grass in abundance at all times during the day from the first day they eat to the time they are well feathered and have grown their wings. After that those intended for market may be penned and fed green stuff and grain, but those intended for breeding should continue to have pasture and free range. If a large flock is raised quite a pasture is needed to sustain them.

It takes geese almost as long to reach full development as it does cattle or sheep, but they remain profitable for many years. Yearling geese are very poor breeders; two-year-olds are better, and they only reach their best at three years of age. If one wishes to make a start in keeping geese, the best plan is to buy breeding stock early in the fall. They must not only become accustomed to their new quarters, but to each other, for geese do not mate readily, and if put together after January 1 will often fail to breed that year. Old well-mated geese of the highest quality are the cheapest and most profitable to buy.

The best way to get the finest geese is to buy young ones, and to order them before they are hatched. Have the large, early hatched specimens selected for you and delivered early in the fall. They must be kept at least one year without profit, and two years before they will do their best, but in this way one knows the age of his stock and in the end will get better results. Two geese are usually sufficient for each gander, and they would do better to be in pairs during the breeding season. The breeding season begins about February 1, but some individuals begin to lay as early as December, then stop and begin again February. They usually lay from fifteen to twenty eggs before becoming broody. As soon as they show an inclination to sit they should be removed, placed in a box for a few days with water for drink, but given no food. After this put them back in the yard again and they will soon commence laying.

About February 1 is a good time to divide the flock. It is usually very difficult to distinguish the sex in geese, but about this time the distinction is easily made by the ganders, who begin decided supremacy. One gander will drive all others out of the pen if they can get out, or injure them quite severely if they can not get out of his way. Leave one or two geese with the boss gander and remove the others to another pen, and in the same way continue to single out pairs or trios until you have them all separated. This is only for the starting year. After they are separated put leg bands on them and record the same for future reference. It is a difficult matter to distinguish the young from the old in the fall, and the use of the leg band is the only way out of the difficulty. If holes are punched in the web of their feet they will grow up after a while and the scar can hardly be found.

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From *Poultry:* There are no fowls that respond to treatment or furnish better returns than geese. They will mature just as rapidly away from streams as near them. A generous supply of drinking water is all that is required. There are many places on the average farm that

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are worth little for cultivation but could be used with excellent results for raising geese. The cost of food is small in comparison with the cost of that used for other fowls bred for market. A goose on range gathers the larger portion of its food, consisting of grasses and insects and other animal and vegetable matter to be found in the fields and brooks.

The goose occupies the same place among poultry that sheep do among farm animals, and if cared for will prove just as profitable in proportion. It is just as necessary to pluck the feathers from the goose as it is to shear the wool from the sheep, and the product has a great demand. Feathers may be picked four times a year, during the summer, and each fowl will yield about two pounds of feathers in a season, which are worth in the market about $1.50.

The Toulouse breed is one of the largest and, in my opinion, the most profitable and probably the best known of geese. They are more easily kept without a pond of water than the Embden or other breeds, and with proper care can be made to weigh more. The young are easily raised, and when let run with the old fowls they need very little care. Toulouse geese mature very rapidly, attain an enormous size, and when fattened bring a high price in the market. The male and female look so much alike that it is quite difficult to tell them apart. They are very stately in appearance and among the most beautiful of water fowls. They live to be very old; some breeders report them living and doing well at thirty years of age. They also are not subject to the diseases common among other poultry, and are very robust and hardy. They rarely need shelter, and will stand out in snow and ice during zero weather with apparent pleasure. They do well in cold climates, as well as in the south, and will pay a profit on a farm too poor to otherwise pay the taxes.

PREPARING GEESE FOR MARKET.

By MRS. A. C. MCPHERSON, in *Successful Farming.*

Geese may be taken direct from good pasture and put upon the market, yet the quality of the flesh and the weight is improved by the addition of grain. Economy in feeding and fattening for market will be attained if a few rules are followed: Pen the geese out of sight and hearing of the other geese. Feed oats, beans and dampened corn meal and give corn for the evening feed—the corn should be cooked or scalded. An abundance of green food must always be provided and care taken that not enough grain should be given to spoil the appetite for green food. Alfalfa, preferably green, with young rye, and potatoes, turnips, etc., will furnish the green food.

Feeding pens should be cleansed daily and refuse removed. An abundance of fresh water must be given daily; if a frame of slats is placed over the trough it will aid in keeping water clean.

When the geese are in good condition, two weeks will suffice to fatten. Geese intended for market should be fed some grain at evening from goslinghood up to the time when they are ready to finish for market. They will then require less food and time for fattening.

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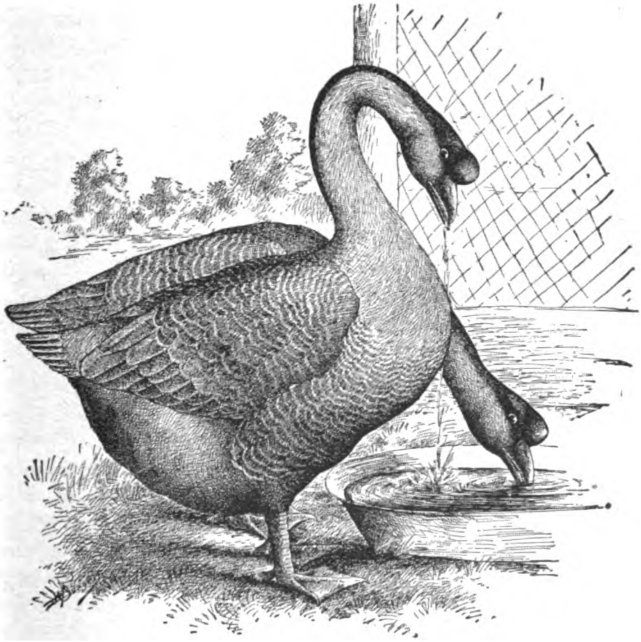
Toulouse and Embden geese are both of large size and profitable for marketing. A cross between two different breeds produces a superior flavored fowl, which commands a higher price than others.

There is a growing demand for geese in cities. The Jewish housewife, whose religion forbids the use of lard in the household economy, provides instead goose grease in large quantities, consequently a large percentage of buyers come from that class.

The eastern states furnish the large part of all the grease of the markets. There are many farms there of rough pasture lands which when devoted to the culture of geese bring an income which could not be obtained otherwise. The west could raise them in limitless numbers if so disposed, because possessing almost unbounded resources.

Geese may be plucked as often as every six weeks during warm weather, but once during the season is better for the goose; quills should be hard and dry when ready to pluck, otherwise there is suffering. The humane societies in England have interfered with breeders to the extent of driving many out of business for cruelty in plucking out of season. There is always a good demand for goose feathers and no danger of the market being overstocked, and prices are always good. The goose retains her laying qualities until a great age. They have been known to produce eggs up to thirty years of age.



A pair of Brown Chinese Geese.

TOULOUSE GEESE.

By ROSE S. MILLER, in *Successful Farming.*

The Toulouse goose is the most teachable piece of poultry there is on the farm. I found this out quite by accident. When my geese arrived on the place my friend who brought them said: "Do not let them stay on the nest when they begin to want to sit, because if you do they will stop laying, and will lay no more that season. Whip them a little and they will leave the nest."

Whip a goose a little! That seemed not only cruel but ridiculous, but I learned that the friend was quite right. I don't whip, but I reach into the nest with a gloved hand and pull the goose off the nest. She does not like this at all, but after she has been "extracted" a few times she will run off of her own account if she sees me coming.

Another thing, a flock of geese were troublesome. They would drive the pigs from their feed; they were not willing that the other poultry should have any rights, until the master said: "Well, I guess I will kill all the geese; they are such a bother." But one day somebody called the Collie and bade "sic 'em!" The Collie, obedient thing that he is, went chasing after the flying geese, and they did not chase him back or stop to make any hissing comments. Of course, the dog was not allowed to chase them far or do them any injury at all. This was practiced only a few times, but the geese learned, and if they were making themselves obnoxious in any way all one had to do was to call the dog's name. Many times when the dog was not within a mile the geese would leave whatever they were doing and become very pleasant and docile, just because the dog's name had been called They do not forget, either. So there is no reason for not raising geese, because they can be taught more easily than any other fowl known. I believe geese could be trained to do all sorts of circus tricks if any one would spend a little time teaching them.

My first Toulouse goose had a big box allotted her for a nest the first year, and to this day she lays right in that same place. From year to year she remembers the place of her nest, and when spring comes new straw is put in for her, and she goes as naturally to that as a cow to her own stanchion or a pig to its pen. I doubt very much if a cow would remember her stanchion for as long a period as the goose does her nest. A goose will also remember her winter quarters, and she will go to them each year when the cold weather comes unless she is shut out. The goose likes to stay out in warm weather, but she seeks her place when winter comes.

The goose, unlike the duck, does not scatter her eggs wherever she happens to be. You may be sure each laying time to find the eggs where they should be, but my geese seldom ever lay together in the same nest; each gose chooses her own place and keeps it.

All this is true of the big Toulouse goose. I can not vouch for the small common geese.

Geese are profitable, too—the right kind of geese—and my preference is for the Toulouse, as they are hardy and splendid layers, furnish fine meat and produce a good crop of feathers.

You can pick the goose, after she stops laying, at least three or four times, thus getting a good quantity of the best live feathers. One may begin picking the gander as soon as it is warm enough, and keep on once about every six weeks until Thanksgiving time. It is better not to pick the geese until quite late in the fall, as otherwise they begin to lay too early, so that the eggs are apt to get chilled.

A goose in her second year will lay about forty eggs, and geese grow better and better for many years, and live to be very old. Four eggs are plenty to put under a hen, and geese are heavy to sit, anyway.

Two geese are sufficient for each gander, and they will do better when kept in pairs during the breeding season.

It is often claimed that geese never have lice, but they do. Unless they are badly infested they will seldom die of lice. Don't place goslings in a house that has been occupied by other poultry, unless it is thoroughly cleaned and known to be free of lice. If they happen to get busy, use some good louse killer or a little olive oil where the vermin are found. Keep the goslings in a shady place after using the oil.—*Farm World.*

Goose eggs require from twenty-eight to thirty-two days to incubate. If the weather is mild and the hens are good sitters, the eggs will usually hatch on the twenty-eighth or twenty-ninth day. The hatching period varies a little according to the variety of geese. The Embden and Toulouse are the largest, and the eggs are slower to hatch than those of the smaller varieties, such as the Chinas.

Geese are very profitable to raise. The Embden, a white goose, is the best, especially if mated with a Toulouse male, says the *Mirror and Farmer*. The Toulouse is partly colored, while the Embden is pure white. All breeds of geese have the males and females the same color. The large breeds of geese do not forage over as much land as the small ones, but they produce many more feathers. They also fatten more readily for market. An adult gander of the Toulouse breed should not weigh less than twenty-five pounds, and the goose two pounds less, although some have been known to double that weight. If breeding for white feathers alone it is best to breed the white geese, as the market for white feathers is better than for the colored ones. The goose flesh is fine eating, and when once the taste has been firmly acquired the owners of the flocks wonder how they could ever eat the ordinary fowl again. The cost of keeping geese is almost nothing, especially during the summer, for they are great foragers and great consumers of weeds and refuse. They will look out for themselves if given plenty of room, and the farmer who has a large patch of land and does not raise some makes a great mistake.

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PROFITABLE TURKEY GROWING.

By J. F. Crangle, in *The Feather.*

There are six recognized varieties of turkeys in the American Standard of Perfection. For general purposes the Bronze turkey is considered to be the best, for many reasons. They are very hardy—we might say the hardiest of all turkeys—good layers, and the best of mothers. A Bronze turkey will lay from eighteen to forty eggs a year under proper management. In breeding turkeys, a person should select stock for the season not later than the first of December preceding, by selecting out the finest-shaped birds. One of the most particular points is to be sure that their breastbones are all straight, as many turkeys have crooked breastbones. When speaking of the breastbone, we might say that it is the bone which runs between the legs. A person can easily ascertain whether the bone is crooked or not by catching the turkey and examining the breastbone by feeling of it. If the stock is selected early in the season, say not later than December, we are quite sure, from experience, better results can be attained. It takes a Bronze turkey several weeks to get wonted to a place.

It is generally considered that one male bird should be mated to from five to eight hens, but a good, vigorous male is capable of taking care of twenty-five hens, if necessary. But right here we might say that it is not a good plan to mate one male turkey with too many hens, for the simple reason that a male only has one connection with the female. If the male bird, from any cause whatever, should not fertilize the litter of eggs, the best part of the whole season is lost, because if the female has been served by the male bird she will go off and make her nest, lay her litter of eggs, and the eggs not being fertilized, the same is lost. So it is not wise to depend too much on one male bird with too many females. One of the best ways I know of to overcome the difficulty is to have two male birds, with any number of hens from five to twenty-five, and allowing one male bird to run with the females every day alternately; a great deal of the risk spoken of above will be avoided; but under no consideration allow both toms to run with the hens at the same time, for as a rule you will generally make a failure. After the first of March you will find that the females will begin to wander a little away from home, and this is about the time they are beginning to look up a place to nest. This will generally occur about two weeks before they begin to lay. If you wish them to lay near by, they can be made to do so in many cases by supplying nests for them made out of old brush or boards placed together alongside a stone wall. The females like to hide themselves away when they lay, but with ordinary farmers who only have from five to ten turkeys, it is a very easy matter to find their nests by keeping in a secluded spot and watching the hen. Do not let the female see you, for sometimes she will not go to her nest for hours.

In many of the eastern states, where a few years ago they raised hunrdeds of tons of turkeys, they now have to import them to meet the demand, as it seems almost impossible to raise them. One of the main causes for this decline in the raising of turkeys is, I think without a doubt, inbreeding. Farmers, as a rule, do not like to invest a few dollars for a male bird, and they usually go to Tom Jones or one of their neighbors and borrow a tom, and this thing has been done for so many years in the past that the vitality of the turkey has about run out, and by doing this it has gotten so low that it created disease. I really think that many of the turkey diseases with which we have to contend at present have been caused by lowering the vitality of the turkey, as I believe there is no other variety of bird in which the vital forces decrease so rapidly by inbreeding as in the turkey. I think it is quite possible, under proper management, to raise turkeys in every state in the Union, and I believe that if the farmers in general will be more careful about not inbreeding, and will spend a few dollars in order to get a good male bird, and thus introduce new and hardy blood into their stock, they will be able to raise turkeys. I would advise people who have plenty of range for their birds to buy a half-wild gobbler. It is almost impossible to get a pure wild gobbler in this country unless you happen to run across one by accident. About all the people who claim to have wild turkeys have nothing more than half-breeds; but with these you get enough wild blood to make the offspring very much stronger, and this will be very noticeable the first season.

After the hen turkey commences laying, probably in some sections of the country it will be very cold at night, almost to the freezing point, and therefore under such conditions the eggs should be gathered every evening and marked with the date of getting; then they should be placed in a pan filled with bran, with little end of egg down, and then the whole placed in a cellar or any cool place, and for two or three days afterward they should be turned every day. It would be well to keep them ten or twelve days, but would not advise keeping them after that time, as perhaps not so many of them would hatch. When these eggs are taken out of the nest, a glass egg should be placed in the nest in order to keep the turkey there; otherwise when she comes back to lay and finds no eggs in the nest, as a rule she will desert the nest and look up another one and lay elsewhere. You will find that a good mother will cover her eggs all up with grass, so that in looking for the nest it is necessary to be very careful, as otherwise you may step into it. An ordinary turkey hen will cover eighteen eggs. If she lays any more than that number I take the extra ones and put them under a common hen, setting this hen and the turkey at the same time. If you are afraid your eggs are going to be too old, put the oldest of them under the common hen. She may hatch out a week ahead of the turkey, but as soon as the turkey hen hatches out her eggs give all of the poults to her. Be sure there are no lice or vermin on the hen when she hatches. It is also well, when you transfer the poults from the common hen to the turkey mother, to dust them well with insect powder of some kind. It takes twenty-nine days to hatch turkey eggs. After the twenty-nine days are up, if the turkey does not leave her nest, do not disturb her, because many times she stays on the nest twenty-

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four hours after the young poults are hatched. The main reason for this is to give the poults time to gain strength in their legs after hatching. One of the best ways I know of to overcome this is to take a little stale bread moistened with milk, put it gently near the nest, near enough that the turkey hen may get something to eat, and if the young poults are hungry she will call them out. If she does not appear inclined to move, do not disturb her. It is a very easy matter to find out whether or not she has hatched any poults, for, as a rule, you will find the broken eggshells scattered near the nest. At the expiration of thirty days, if you see no signs of the young turkeys, it is well to investigate the matter by raising the turkey off the nest and ascertaining whether the eggs are infertile or not. If they should prove to be infertile, the best way is to shut up the female turkey for four or five days in a coop large enough for her to get a little exercise in, give her food and water and a place to dust herself in. If this happens early in the season, within three or four weeks she will commence to lay again.

One of the best places in which to let the hen turkey run with the poults is a field where the grass is short. As a rule, a pasture is very good; woodland is very suitable. Keep them out of meadows and grain fields until after the grain and hay are harvested, because the wet vegetation is very bad for the young poults, as it chills and sets them back in their growth.

You will always find the finest and strongest turkeys where they are given free range, as much range as possible. As a rule they will not wander far from home. Under proper management you can place turkeys anywhere on the farm you wish, and by teaching them to roost in one particular place they will come to regard this as their home and will know no other, and you will always find them wherever they have been taught to roost. This can be done by watching them at night for a few times in succession and driving them to the place where you want them to stay, and just before dark they will go up in the trees or on a roost that has been put up.

With the right kind of breeding stock, turkeys at Thanksgiving time should weigh about as follows: toms, sixteen to twenty pounds; hens, ten to fourteen pounds.

There are two things which have to be done in order to have good success in breeding. One of them is to get the right kind of breeding stock, and the other is to feed them properly. Those are the two main things and the only requirements.

The proper way to feed breeding stock is to be very careful and not overfatten them. Of course all turkeys are fed principally on corn before Thanksgiving and Christmas, as many of them are dressed for table purposes at that time. As soon as the breeding stock has been selected they should be fed on entirely different lines. The principal food from that time up until the hen commences to lay should be oats. The best way to feed oats is to scald them, but if a person does not care to do this, they can be fed on just ordinary oats with the hulls on. During the very coldest weather in January and February I perhaps would feed them a little corn at night, but never any in the morning, and at nighttime

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feed them no more of it than they will eat up clean within five or ten minutes after giving it to them. Where the turkeys have range around a barnyard a person must be very careful not to overfatten them, and as a rule it is only necessary to feed them at night, and under such conditions I would feed corn only about three times a week, all other feeds to be oats.

Another food which we think is necessary for turkeys to keep them in good health is ground charcoal, but be sure not to have it ground fine, as turkeys will eat it better when it is very coarse. On a farm they can ordinarily find all the grit that is necessary for them to have, but I think the eggs will hatch better if the turkeys have oyster shells. These also need to be ground coarsely. If the turkey has not enough lime to properly supply the egg, the shell will be very porous, and many of the germs will die on this account. The oyster shell should be set around in small boxes where the turkeys can get at it handily.

Under no consideration breed from a diseased turkey. A turkey that you know has been sick, or is sick, it is much better to kill than have it running with the breeding stock.

As a rule, many young turkeys are killed by overfeeding. On large farms it is not necessary to feed more than once a day where the turkeys have plenty of range. Young turkeys can live on insects and many little grasses which they relish. During the berry season, especially when wild strawberries are ripe, it is a pleasure to watch the little turkeys pick and eat them. In seasons when there is a good crop of grasshoppers the turkeys will live almost entirely on them. Where young turkeys have to be fed, the best food I know of is stale bread, but be sure the bread is not sour. When speaking of stale bread I mean any kind of bread three or four days old. It is very nice to moisten this bread with sweet milk. Clabbered milk is also very good for the young turkeys. Put it in a pan on the ground where they can get at it easily. During the very warmest weather of summer it is important to keep the turkeys hungry, for if you do not there is great danger of their having bowel trouble.

The foregoing is a plan for feeding young turkeys where they have free range, but if you are on limited range the best plan I know is to take three boards, make a triangular pen fourteen inches high, put the young poults inside of it with the mother, and feed them there until they are old enough to jump over the boards. As a rule, after that time it will be all right to give them free range.

Many people think it is necessary to put the hen turkey in a coop to keep her near her young, but this is not true, as she will stay by the little ones, and it is almost impossible to drive her away. Where the young poults are confined in a pen as above described, it is necessary when they are young to feed them four times a day with stale bread moistened with milk, and give them fresh water or clabbered milk also four times a day. It is also very good to give them a little red pepper mixed in with the bread about twice a week, as it seems to tone them up a little. Should you find that the young turkeys are drooping and do not seem to pick up, the very first thing to look for is lice. If young turkeys

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are lousy it is impossible to raise them. Hen turkeys generally keep free from lice, but some, like some human beings, are very filthy, and all the young poults they will ever have will be lousy, the same as the mother. In looking for lice it is best to examine the little wings, as generally you will find them in the quills, or where the quills should be. They can be killed by using Dalmatian powder, or any other good insect powder, by dusting them with it. After dusting them with Dalmatian powder they will look like a little yellow ball, and in two or three days will commence to brighten up. I feed them stale bread moistened with milk for about four weeks, or until the young poults are able to take hard food; then, when they have limited range and have to be fed, I would feed cracked corn and wheat alternately, but both grains should be scalded and not fed to them until it has cooled. If your poults should have diarrhea from any cause, usually one feed of boiled rice will stop all bowel trouble. Just give them what they will eat up clean.

I commence to feed all turkeys the first of October, or not later than the middle of October, in getting them ready for Thanksgiving or for the markets. They should be fed morning and night, but never feed them more than they will eat up clean. In fact, a great deal of trouble is caused sometimes by giving them too much to eat. At the time you start to feed them you should only give them sparingly for the first week or ten days, giving it to them night and morning. The principal food from October until the first of December will be corn, either whole or cracked. Above all things, do not feed any new corn. I have seen very bad effects result from feeding new corn, and have seen large flocks of turkeys knocked out from this cause. It gives them diarrhea, and they get it into their systems and it is very difficult to stop it. Even after you have stopped it, you have lost so much time in getting rid of it that they do not recover for weeks.

As a rule, most of the turkeys will be fat and fit to kill at Thanksgiving time, but there may be a few that will have to be carried over until Christmas. Many people advocate shutting up turkeys, confining them in order to fatten them. I have tried this plan and found it to be a failure. Many times people can not understand why their turkeys are not as fat as they should be, but almost invariably you will find that they feed them in confinement, and the turkeys could not stand it, especially for a long period of several weeks. The best way we know of is to give them free range, for generally you will find that turkeys will not wander far away from the farm buildings in the fall when the weather becomes cool. They will eat their morning's feed, and most of the time during the cold winter will lie down in a warm place and sun themselves. If the turkeys are shut up about five days before the time you wish to dress them, I think they will be in the best possible condition.

A great many people think turkeys need to have shelter in the way of a building. That idea is entirely wrong. The best possible way of keeping turkeys in good health is to have them roost away from buildings, perhaps in trees or in a place sheltered from the winds. I have known turkeys to sit out in trees with the thermometer fifteen to twenty degrees below zero and be much healthier than turkeys that were inside a building. The only thing about it is this: Turkeys can stand any kind of cold weather if they are roosting in a lee place where the wind does not blow too hard, so that they can keep their heads under their wings. I have seen turkeys in trees outside in a snow and rain storm with the wind blowing at the rate of forty miles an hour, and the colder it got the higher up they would want to go, instead of wanting to come down.

Successful Farming: For breeding purposes the birds should not be thin, and the hens should be at least two years old. The gobbler may be from one to three years old; if kept longer he would scarcely be fit for the table. The young turkeys are much larger and hardier from well-matured birds than from young ones.

Not more than eighteen eggs should be put under one hen, and not that many unless the hen is rather large. The turkey hen should be the mother in preference to a chicken hen, as the former understands the nature and needs of the little turks, while the latter does not. If you wish her to have more turks, set a few eggs under a chicken hen, and in a week finish out her setting with chicken eggs, in order that poor biddy may have some reward for her four weeks' work when the little turks are taken from her. About twenty turks are enough for one turkey hen to care for.

Before hatching time the hen should be thoroughly dusted with insect powder, and when through hatching the feathers should all be turned back and examined along the shafts and at the roots for lice, and when found, apply melted lard with a few drops of coal oil in it. This should be repeated about every two weeks for some time. Nothing should be put on the little turks until they are about two weeks old, when the feathers on top of the wings should be lifted, and if lice are found in the grooves formed by the wing feathers, apply a very little lard as grease will kill the turks also if too much is used. From now on until the beads are formed on the neck, a close watch must be kept, not a tuft of feathers or down escaping this vigilance.

The cause of nearly all droopiness in turkeys, big or little, is lice; they are also the cause of a great deal of the bowel troubles. For the latter disease I exterminate the lice, then give half of what is a dose for a person of most any kind of purgative medicine to a young turkey and a full dose to a grown one.

I keep the old turkey and little ones in a pen for almost a week and then turn them loose to roam and roost where they will. If kept in confinement, especially in dark coops, they will soon die. If they are well fed the mother turkey will see that her little ones do not get too much dew of mornings. I feed them cornbread, biscuit crumbs, milk curd (cooked longer than for table use), onion tops and grit for the first week or two; after that wheat or cracked corn for a change. I have had good success in using milk curd almost exclusively, but if given too sloppy and not not cooked well it is likely to cause bowel trouble.

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OLD TURKEYS FOR BREEDERS.

By A. E. VANDERVORT, in *Farm and Fireside.*

I believe that the average turkey raiser makes a serious mistake in disposing of his breeding stock every year and recruiting his flock from young and often immature birds. Young turkeys do not make number one breeders. While it is very true that a yearling hen will lay more eggs in a single season than one three or four years old, still, from practical experience, I have become convinced that the latter will produce a greater percentage of strong poults. My turkeys last year varied in age from yearlings to six- and seven-year-olds. As each hen had a leg-band, it was little or no trouble to trace them accurately. After a close observation, I was well satisfied that the oldest hens paid the best. They invariably proved to be the best mothers. A greater per cent of their eggs were fertile, and the poults hatched seemed to possess greater vitality. One of my oldest hens during the fore part of May made her nest and brought off sixteen fine strong poults, but owing to an accident, for which she was not entirely to blame, every one of the youngsters perished. Later she made two unsuccessful attempts to bring off another brood, but failed in both instances. In the first instance crows destroyed the nest. The second time a mowing-machine wheel put an end to her hopes. One of the most striking instances illustrating the hardihood of old hens is the experience of a friend of mine a few years ago, who succeeded in keeping one hen thirteen years. While she was not as prolific as in her earlier years, yet, in the aggregate, she reared as many poults towards the last as during her more youthful years.

Good authorities on turkey raising agree that breeding stock can be kept with profit as long as they live. While I would not put it quite so strongly, I feel confident that breeding turkeys can be kept with profit much longer than they usually are. In my earlier experience with turkeys I was a victim of the vigorous-young-stock craze, but I am getting farther and farther away from that craze, as I see the errors of such a course. The fact that a domestic pullet will lay more eggs than a two- or three-year-old domestic hen, and hence is the more profitable, does not argue that the young turkey hen will be better than an older one. A domestic hen and a turkey hen are two entirely different creatures, and are bred and raised for two entirely different purposes, generally. There is another advantage in keeping old stock. By so doing the expense of every year procuring a tom to avoid inbreeding is greatly lessened. If the breeder does n't wish to go to an extreme with old stock, he will have no trouble in keeping stock three, four or even five years without change. From actual experience, I feel perfectly safe in saying that a breeder can keep turkeys until five years of age and still have them vigorous.

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BREEDING GOOD TURKEYS.

By Mrs. J. E. Gray, in *The Poultry Tribune*.

One of the greatest and most important factors in successful turkey raising is careful selection of breeding stock. Do not expect to make a success with puny, weak, late-hatched, immatured stock for your foundation, nor would we advise overgrown or unnaturally large, especially in males. Strength, health and vigor, with well-proportioned medium size, are the main points of excellence. In all fowls it is well to remember that size is largely influenced by the female, and color and finish by the male.

A turkey does not mature until from two to three years old, and to obtain strong, vigorous and large offspring hens from two to three years old should be mated to strong, active males of nearly the same age and type. The male and female should be nonrelated, which can be easily adjusted by purchasing toms from one flock and hens from another.

At this progressive age we would advise pure- or standard-bred stock to commence with, and although at first you may think of raising turkeys for the market only, but by beginning with pure-bred stock, and obtaining a Standard of Perfection, so you can learn just how near perfect your birds are, it will be surprising how soon you will drift into the fancy breeding and how soon you will want to place those standard-bred birds in the show room.

There are several good breeds to select from. Among the standard varieties are six, more or less, grown in this country. The Bronze, Narragansett, Buff, Slate, White Holland and Black. In addition to the foregoing there is a nonstandard variety known as the Bourbon Red, which in color and characteristics very much resembles the Buff, and is considered by many to be the same.

The Bronze and White Holland are more extensively grown than any other varieties, and although the White Holland was considered one of the smaller varieties, so much improvement has been made in the last few years that this breed is now contending for second place.

The Bronze, however, holds the place of honor and easily stands at the head. Evidence that it is a favorite is plainly shown by Bronze blood predominating in most farm flocks. It is also a favorite among fanciers, as is shown by the large numbers of them exhibited at our leading poultry shows as compared to other varieties. Its practical qualities are unsurpassed, being hardy, easily raised and fine layers.

It is the largest of any of the varieties, the standard weight being; adult cocks, 36 pounds; yearling cocks, 33 pounds; cockerels, 25 pounds; hens, 20 pounds; pullets, 16 pounds.

In brilliancy of plumage the male is far more striking than the female. The head and wattles are a rich red, which changes sometimes to a bluish cast. The neck, breast and wing bow should be a rich, lustrous bronze, changing in the sunlight to a reddish glow. The breast of the female should have a very narrow lacing or edging of white or gray. The back is somewhat darker in color, as it shows a narrow black band across the feathers; as it nears the lesser tail feathers or coverts it changes to lustrous bronze or gilt bars, and the coverts should end in an edging of white or gray, white preferred. The tail should have a penciling of brown across the feathers, the more distinct the better. The feathers should end in a broad black-bronze band, with an edging of white or gray. In young birds the feet and shanks are almost dark in color, but in adult birds should show a pinkish cast.

The best way to improve in size, weight and markings is to select the finest-marked tom possible and mate him with the largest hens, even though they are not so nicely marked, remembering the tom is half the flock. If these strong points will be closely observed in selecting and mating the breeding stock, both size and fine markings will be transmitted to the progeny and success will be almost assured.

SELECTING TURKEY STOCK.

By E. F. Barry, in *Successful Farming.*

In selecting breeding stock for a market turkey ranch the most important point of all will be to secure good, strong, healthy birds, not akin, and from stock that has not been inbred in the past, as inbred stock is a source of disappointment and failure. It is strange that this habit of inbreeding is persisted in when the disastrous results are so well known. It will pay to mate hens of local stock with pure-bred Bronze, wild or semiwild toms, even though the cost may seem a little high. It must be remembered that the male is half of the flock, so to speak, and no reasonable expense should be spared to prevent inbreeding.

At the present time the Bronze turkey takes the lead and is more popular than all other breeds combined. It meets the requirements of the market, makes a rapid growth, is hardy and a good forager. For the reason that they are so generally bred, it is not difficult to secure good breeding stock at a slight advance over the market price, and one should be able to buy good hens in the fall of that season's hatching, selected from a large flock, for $2.50 to $3, and gobblers of the same age at $4 to $6 each. Older birds, which would be more desirable, would cost a trifle higher; however, first-class breeding stock suitable for starting a market turkey ranch could be obtained from $4 to $6 for hens and $6 to $10 for gobblers.

The standard weight of the Bronze turkey is twelve to thirteen pounds for hens and twenty to thirty pounds for gobblers, according to age and condition. Select turkeys with large frames, snugly built; heavy turkeys, owing to excessive fat, are not desirable. A hen two years old, in good breeding condition, weighing from twelve to fourteen pounds, and toms the same age weighing from twenty-five to thirty pounds, will be considered good weight, but large, stout, vigorous hens should be the aim of the breeder.

If inconvenient to secure all the breeding stock two years of age, buy at least part of the flock that have been through one breeding season,

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and the balance from the earliest poults of the year. In selecting breeding stock it would be best to buy of some reliable breeder who is making a success of the turkey business, whose stock has free range, and as far as known has no trouble with disease.* Better pay a little more for the right kind of stock to start with.

The breeding stock should be purchased before January, in order to become acquainted with their new quarters before the breeding season. In buying this stock it would be best, when possible, to buy from a place of the same kind of climate as that in which they are to be kept. To ship turkeys from a hot climate to a cold one means a chance of loss, and the same when shipping birds from a cold part of the country to a very hot one.

When the breeding stock arrives place them in the stockade and keep them in until they become accustomed to their new quarters; go among them and feed them what they will eat readily; feed often at first; spend as much time in the stockade as can be spared, in order to tame the birds.

After a week or ten days try them out of the inclosure by opening the doors just before it is time for them to go to roost, allowing an hour or more to look around outside the inclosure. It is quite important that the birds are watched at this time and see that they all return, for once beginning to roost outside they will give endless trouble. If they are slow about coming in at night, toll them with a little grain. The following day the birds may be let out earlier in the afternoon, and in this way they will soon become acquainted and may be given their freedom for the entire day.

Having started with good stock, it will be an easy matter to improve and build up the future breeding stock by selecting the most promising young birds from the hens having a good record as breeders; this is where the record card will come in very handy. Always keep the best and earliest hatched birds of the flock for future breeders, marketing those with poor records. After a flock has been built up that will produce hens weighing from nine to eleven pounds and gobblers from twelve to fifteen pounds at Thanksgiving time, then it will be well to begin looking after the fancy end of the business for selling breeding stock at an advance over the market quotations.

To get the top price for breeding stock they would have to meet competition in the showroom. This will cost more than the awards amount to in dollars and cents, but not so as an advertisement. All noted poultry breeders who are securing fancy prices for their stock and hatching eggs won honors in the showroom.

In breeding for the fancy end of the business, health and vigor should not be sacrificed for fine feathers. Gradually, by selecting from a large flock, birds that will be proficient for market and showroom may be secured. In breeding pure stock, a copy of the American Standard of Excellence and two or three good poultry journals will be of great assistance.

During the mating season the proper proportion to divide the sexes would be from seven to ten hens with one gobbler, although it is often the case that successful hatches have been obtained when a much larger number of females have been allowed with one male. Better be on the safe side and have enough males so there will be no doubt of the fertility of the eggs.

TURKEY NESTS.

By Mrs. W. B. Doak, in *Reliable Poultry Journal.*

We believe free range is necessary if strong, vigorous poults are expected, and the best results are obtained if the hens, as far as possible, are allowed to make their own nests. Right here the busy housewife will declare that she can not follow the hen over hill and dale by daylight, but must confine her flock in the garden or some other small inclosure. In that case the hen walks up and down, restless and rebellious, until at last, in a lifeless, dispirited way, she settles down on the nest, which with contempt she has seen her owner make, and deposits her eggs, which I believe will, if fertile, produce a poult that to a certain degree shows a lack of vigor, the result of too little exercise and the restlessness which the mother experienced while laying her clutch of eggs.

Here is my remedy: After the mating season and before the hens show a disposition to hunt nests, a bright morning will be well spent in making nests, selecting sheltered nooks by old stumps, trees or brush piles, and giving the nests a southern exposure.

One season, with twenty-five hens to care for, I had ample proof that this trouble was worth while. Back of the garden and orchard was a chestnut grove, with draws or hills breaking off to the southeast. Along these slopes I made nest after nest, and was rewarded by having at least two-thirds of them voluntarily used, and the hens were none the wiser. Those who have had experience with turkeys know how they object to being cornered or watched. A perfectly gentle, confiding hen in the barnyard seems to have a changed disposition when she has the "wanderlust." I have known hens to go on a run a mile or more from home when they had been worried and watched and suitable nests had not been provided in time.

Avoid buying stock from yarded or pampered turkeys. After an experience of eleven years with as many or more varieties of fowls, I find that they suffer most from restraint and coddling. Giving them free range does not debar one from showroom honors, as I have proved.

The disease which attacks the half-grown turkeys is known as blackhead, from the color of the head, but the disease is located in the liver, and the proper name is coccodiosis. This disease is due in most instances to infected soil, and practically all heavy or limestone soils seem to be infected if any kind of poultry has been kept on it for any length of time. The farmyards where chickens have been raised for a number of years are almost certain to be so infected. The chickens may not suffer perceptibly from the trouble, but it is next to impossible to raise turkeys in such places because of their greater susceptibility to the disease or their lower resistance.—*Colman's Rural World.*

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MANAGING TURKEYS TO KEEP THEM AT HOME.

By **Martha M. Knudeson**, in *The Farmer and Stockman.*

In the early days of our keeping turkeys we were advised that, no matter if they did have besetting sins, we must not interfere, else we would not have "luck" with our turkey crop. We studied the history of the bird from Maine to Florida, standing with Audubon to view those five wild turkey hens sitting together on forty-five eggs, but none of these things shortened the miles we were compelled to travel each season collecting the eggs our turkey hens saw fit to scatter so far and wide.

We were very much attached to the birds, so helpless and foolish in their babyhood and so big and beautiful and storm-defying at their maturity. So we tried the different breeds to see if one could not be found more naturally domestic in their habits than another. We surely got the experience, as one season two hens disappeared almost daily, and finally for several days at a time, and we never found their nesting places until the self-binder had beheaded the birds in the center of a great wheat field. Finally we centered our likes on a breed that really seemed to possess the most desirable characteristics. We tried to work ourself into their good graces by careful, kind treatment and familiarity until they really acted quite docile. Soon the mating season came on. Of course, this was to be the test. There were so many secluded nooks around the farmyards, totally unused, and upon close observation we saw our turkey hens peering into these in a very covetous sort of way. This gave us our cue, and we understood by the signs that it would not be long until Mistress Turkey Hen would be locating her nest. The hens seemed to be anxiously inquiring as to where was the most desirable place. By this time we assumed to know about some of the things agreeable to the necessities, so we provided ourselves with empty barrels, took one to one of these quiet, secluded corners, hollowed out a little place in the earth, fitted in the barrel with the bottom end slightly raised, chinking in bits of wood or stones so the barrel could not be easily displaced. A brick or something similar was placed inside close to the open end, so the nesting could not be easily scratched out. Into the barrel we then threw some fine, soft earth and then the nesting, a generous portion. All was fitted and fixed as perfectly as we could make it and a nest egg put in. On the outside of the barrel a discarded oilcloth, blanket or grain sack was spread to turn the rain down the sides. Then around the sides and over the top we piled brush as generously as our supply would allow. Thus one turkey nest was completed. All the others were similar except in location. One was in a plum thicket, another in the walnut grove, one or two were in the raspberry patch. Of course, it all took time and some hard work. The next morning we drove the flock of turkeys very leisurely around where these nests had been prepared.

A turkey is always inquisitive in regard to any new conditions, so they were over these. They craned their necks and said "Putt, putt;"

then we quietly slipped away. We encouraged the inclination of the birds to stray around in this direction, always quietly disappearing and leaving them to settle things to suit themselves, which they did evidently to their own satisfaction, and surely to ours, as we soon began to find the great, freckled eggs hidden in the barrels and no further inducements were necessary to get the hens to bring out their broods in the same nests. Just before the little turkeys are due to hatch, watch your chance and when the hen is off for feed and exercise sprinkle in the nest a generous portion of insect powder. If there is one thing above another a turkey can not endure it is noise and fright. With care these can be avoided, thus lending additional inducements for your turkeys to stay at home. A generous supply of grain and ever-present good drinking water are additional attractions.

NOTES ON TURKEY RAISING.

By BERTHA M. TYSON, in *American Poultry Journal.*

Many years ago I once heard a man make the statement that the reason it was so much easier to do a thing the wrong way than to do it right was because there were so many ways of doing a thing wrong and only one way to do it right. This comes to mind frequently when reading the "rules and regulations" as given from time to time by many of our prominent turkey breeders, for one can not but note how widely the ideas and suggestions for successful turkey raising differ.

As in any line of work, what has proved successful with one breeder frequently will not do so with another, probably because we each have a different way of applying the knowledge we have gained, and sometimes because we do not grasp the literal meaning of the spoken or written word from those who would share their knowledge with the rest of mankind. There are, however, a few points in turkey rearing where all breeders may meet on common ground, and chief among these should be given prominence the importance of not allowing turkeys intended for breeding birds to be fed heavily on fattening foods. Attempts to force young turkeys will almost always result disastrously.

In feeding I have had good success with oats, very often dry, but sometimes scalded and then covered until well steamed. Wheat is also an excellent grain food for them, and I believe, when fed freely, will be the means of making the plumage much more brilliant. As with all other varieties of poultry, the turkey shows a pronounced preference for yellow corn, and I have found it a valuable food, if not given while new. All new corn should be kept until dry and well seasoned before the turkeys have access to it. Chopped onion is an almost ideal green food for growing turkeys, and I believe takes the place of the wild garlic so much enjoyed by these birds while in the wild state. I also feed chopped turnips, tops and roots, frequently to the breeding birds, believing the turnip acts as a mild tonic on the liver and bowels, and having found this food to be always greatly relished by the birds. For meat food, after the most of the bugs and grasshoppers are gone, I sometimes give

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beef scraps, either in the steamed oats or alone, always being sure that the scrap is of unquestionable quality, for it is very apt to cause bowel trouble if not of good quality.

In the matter of housing, we never house turkeys. They roost principally in the trees, or sometimes on the roof of an old building. This outdoor roosting is, I believe, very necessary to the health of the birds, as they, more than other varieties of poultry, have never become accustomed to being shut up in closed houses. During severe storms with cold winds our turkeys have access to open sheds and open buildings, and usually take advantage of them for protection from the storm, but invariably when night comes they fly to the trees or to the top of some of the farm buildings. This flying about is excellent exercise for them, and roosting in the open air makes them strong and vigorous, and the contact of the plumage with the elements produces greater brilliancy of the feathers, as is evident from the lustrous plumage of the wild birds.

A point on which all turkey breeders agree is the necessity of having from the start the very best breeding stock obtainable, and that the males and females be unrelated. Frequently we hear of breeders who keep hens not related to each other and a tom unrelated to the hens. Many people believe that inbreeding in turkeys is more disastrous than with any other fowl, in that it weakens the offspring. The great majority of "turkey troubles" are attributed to inbreeding, and while I believe most breeders have not practiced it long enough to know whether the results are good or bad, I can not believe that inbreeding would do other than debilitate the breeding stock if practiced for any length of time. Among all wild birds the mating is governed by selection, but it has not been found that they inbreed, at least to any great extent. In most cases among wild birds the weaker members of the flock do not long survive the hardships they are exposed to, so that in all probability where inbreeding has been practiced the young reach an early demise. Most of our large turkey breeders have several flocks of turkeys kept on separate farms, in order to be able to supply nonrelated stock to their customers.

Another point of great importance in turkey rearing is that of having mature breeding stock. I do not think a tom under two years should ever be used for breeding, and those older are much more apt to impart to the poults the strength and vigor so necessary to bring them to maturity. At the beginning of the season we are all a little too apt to reckon on the number of eggs that will hatch rather than how many of the poults will be worth even trying to raise. If the birds are well mated the eggs usually hatch well, and if the breeding stock is not too immature and is otherwise healthy, the poults will not become victims to all the diseases young turkeys are heir to.

In many sections of the country, particularly the East, turkey raising is not as easy as it once was. Much of the difficulty experienced is probably due to the fact that turkeys, as a rule, do not do well when brought up with flocks of other varieties of poultry, and especially is this true if any attempt is made to yard or house them, or where immature specimens are used for breeding purposes. Of late years the ravages of the blackhead scourge has been the means of preventing many admirers of our national bird from attempting to raise them. At the shows the

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specimens, while good, are generally few in number, and an apparent lack of interest in the turkeys on exhibition is in evidence.

The prominence of the turkey on our feast days, the fact that the wild turkey was our largest game bird, and as someone has called it "The American King of Birds," together with the fact that the turkey is a bird of marvelous beauty, it would seem that in coming years this, our national bird, would rightfully claim a greater prominence in the show-room. Without doubt the turkey has claims upon us which all recognize when he is on dress parade, and an uneclipsed prestige over all other birds when well roasted and served on a garnished platter. Undoubtedly, in the not distant future, when the cause and prevention of blackhead has been fully determined, turkey raising will become more popular than it is to-day. The demand for turkeys in the market is always good. Good breeding stock brings top-notch prices, as do also good specimens for ornamental purposes or for stocking game preserves. Turkeys are never a drug on the market, and the breeder who can raise a goodly number of them will be assured of good profits.

CARING FOR THE TURKEYS IN SUMMER.

From *The Rural Home.*

While it is true as soon as turkeys begin to "shoot the red" they are comparatively safe from the troubles of early life, it is not at all good policy to neglect them and allow them to take their own course without care during the remainder of the season.

The way to make the most money from turkeys is to secure the largest possible frames in the beginning, and then cover these big frames with as heavy a coat of flesh as it is possible to get on them.

Under ordinary conditions, turkeys will find a living in the fields without much attention from the owner. They have a faculty of going about in meadows and pastures, searching for insect food, without in any way damaging the crops. Their constant search for insects makes them valuable to farmers, because their appetite for such pests leads them to destroy thousands of the farmer's worst enemies.

Because they can find a living for themselves, the owner should not consider that they need no other feed beyond what the fields afford them. Growing turkeys should not be allowed to go a single day without grain feed of some kind. They should be given every evening a liberal feed of grain, of which corn should be the smaller part. This evening feed of grain keeps the young turkeys growing rapidly instead of making slow progress during the hot weather. It also gets them in the habit of coming to the house every night, and they sleep at home instead of on the most convenient fence, as they often do when not fed daily during the summer.

When turkeys are brought up to be familiar with their owners they grow much better, because they are not worried at the sight of a human being and live quietly, growing more rapidly because of their lack of excitement.

If milk is available it will pay to make cottage cheese for them every day in the year. The curd made by heating sour milk or buttermilk is

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very rich in those elements that go to make large frames and heavy flesh, and there is hardly any other way by which so much value may be extracted from waste milk.

It goes without saying that turkeys will not flourish in confinement of any sort. No one should undertake to grow them unless he has ample range for them, because they must have entire liberty or they will not make progress.

Meadows, pastures, and, after harvest, grain fields, are ideal ranges for turkeys. They are busy foragers, and the insects they find give them the meat feed that is necessary to their best development. If the owner will attend to giving them a moderate grain feed every day he will find that his care and the cost of the feed will be returned many fold when it comes time to put the birds on the market.

After it is six weeks old a turkey is stronger and stands a better chance to mature than does a chick. But these first six weeks are the ones of greatest caretaking if the poults are to survive, says the *Prairie Farmer*.

If the poults are hatched by turkey hens they will have cared for the eggs by making a nest on the ground. If they are hatched by chicken hens the eggs should be dampened twice each week with lukewarm water. They must be turned a little each day also, since the hen will not turn them as she would turn her own eggs. It will take twenty-six days to hatch turkey eggs.

When the poults and hens are taken from the nest they should be well dusted with road-dust to which a little sulphur has been added. Dust them every day until they can dust themselves, for vermin are the poult's worst enemies.

The young turkeys, when hatched by a turkey hen, are fed from their mother's mouth. She picks up the food and gives it to them. A poult looks up, not down, for its food. It finds bugs on the leaves of plants and seeds on the stems. So it is when the eggs are hatched by chicken hens; the younger turkeys must be taught to eat from the ground.

If you will hold the food in line with the poult's eye until he sees it you will find him very greedy. They grow so fast and feather so rapidly they need food frequently during the first six weeks.

Boiled eggs, Dutch cheese, bread and milk squeezed dry, oatmeal scalded and squeezed dry, together with wheat and buckwheat screenings, make their best diet. Add to this beef scraps or finely chopped meat every day or two. When the poults can hop over a four-inch board they are strong enough to follow their mother seeking food.

They should be kept at home at night and not be let out until the grass and weeds are dry in the forenoon, but during the day they should be allowed to roam where they choose.

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WINTER CARE OF TURKEYS.

By A. E. VANDERVORT, in *Farm and Home.*

Much of your success with turkeys the coming season depends upon the care your breeding stock receives during the winter months. Without proper care and attention, as well as suitable quarters, the turkeys will not come through the winter in good health, and as a consequence will not be in good condition for the breeding season, and that means poor success with the young. In this locality I find it hard enough to raise the young that are bred from healthy stock, without the extra handicap of none too healthy breeders.

Turkeys do not want damp, stuffy quarters in winter. An open shed or loft that is fixed so as to avoid much draft makes an ideal place to keep them. Farmers are especially fortunate in this respect. They nearly all have a hayloft or shed that could be used, or even the barn makes a good place. But how often I find a farmer keeping his breeders with his hens in a damp, stuffy place under the barn or in a small house without much light and with very little ventilation.

Turkeys can stand quite a bit of cold, and I would rather have them roost in a tree than in a henhouse. If you are fortunate enough to have a shed or loft that you can use for winter quarters, you can depend on it that your birds will come through the winter all right.

In feeding turkeys I give plenty of corn and other grains and provide plenty of grit and water and give an occasional feed of mash.

THE BRONZE TURKEY.

By WM. H. HERSHMAN, in *The Poultry Tribune.*

In selecting my turkeys I take from seven to eleven pullets or hens and mate them with a good cockerel or cock bird. I use the best to be had. Don't be afraid to pay a few dollars for a good bird. Better pay $50 for a pair of good birds than pay $50 for 50 scrubs. You will be the winner in the end with the good birds. Some of our friends that are raising fancy poultry have the idea that bronze is green and that green is bronze. Better get the right idea of bronze before you go any further. Bronze is a mixture of copper and brass and carries a rich red shade. It is not green or brass color as some suppose.

Don't get the idea in your head that size is the only thing in raising turkeys. There is reason in all things. A bird that is full standard weight will do you more good than any other sized bird. I have satisfied myself well from experience. A few years ago I mated seven hens with a forty-seven-pound yearling tom, and what was the result? I raised three or four turkeys that season. This year I had one flock mated with a forty-pound yearling, and out of the first ninety eggs the party told me he got ten birds. I had four other flocks mated this season with

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cockerels and cock birds that were two or three pounds above standard weight, and what was the result? Nearly every egg hatched.

Now, in selecting birds for breeders, take hens that weigh from twenty to twenty-two pounds each and pullets from fifteen to eighteen pounds, and mate them with a good, vigorous cockerel or cock bird of standard weight and you will get results. When my turkeys begin to lay I keep the eggs gathered in every day, and as soon as I get enough, say forty-four eggs, I set them under four chicken hens, and as soon as a turkey hen goes to setting I make her a nest in a coop and have the coop in a park that is covered all over with woven wire. I put a setting of eggs in the nest, and when it gets dark I get the turkey hen and put her on the nest. In about two days I open the door of the coop and put feed and water in the park, and the hen will come out and get feed and water and go back on the nest again. As soon as the eggs begin to pip under the chicken hens I give them to the turkey hen, and the ones the turkey hen has to the chicken hens, and in this way you don't have to keep your turkey hens sitting all summer. A turkey hen will claim young turkeys if she has only been sitting three of four days. After the birds are hatched I put them in a large orchard and feed with steel-cut oats and a little charcoal till they are about a month old, and then I give them their liberty; but after that I try to keep track of them and give them steel-cut oats and cracked wheat twice a day.

Turkeys can not be raised successfully in a small park. Their nature is to roam around and they want quite a little territory to run over. Powder your turkey hens well with some good insect powder before you put them out with young turks, because if the young turks get lousy they won't last long.

EXPERIENCES AND OBSERVATIONS WITH BRONZE TURKEYS.

By Mrs. Alice Curnutt, in *Poultry Culture*.

Experience has taught us we must keep as close to nature as possible in turkey raising, must let them roam over fields and meadows and among branches in pursuit of the various kinds of vegetation and mineral matter that are so essential to their welfare. There they also have a choice of insects and plenty of them, of which the grasshopper is their most delicious morsel. In roaming they also get the exercise they must have to assist digestion, and also grow more bone and greater size in this way.

However, we must be sure they are at home by night. Some years ago we had a sad experience in letting a flock stay out all night. Our turkeys then were not so thoroughly domesticated as now, so had to be driven home at night. But on this memorial evening we had a hard rain late in the afternoon. The grasses were very wet and we had company, so we finally decided to leave them out "just this once." There were thirty-two young turkeys and two hens. The young ones were as large as chicken hens. We went to sleep that night with a feeling of uneasiness, so were up early next morning, only to find one mother hen (almost featherless) and three young ones left of the thirty-two awaiting ad-

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mittance at the turkey-yard gate. Right here we lost hope that they might have been unmolested and began an investigation, and found them lying dead in the tall grass, one here and there over a twenty-acre meadow—the work of a fox. Heartsick and almost discouraged, we returned to the house and gave more attention to a later-hatched brood of poults that we had intrusted to a faithful chicken hen, not that we preferred to raise them with a chicken hen, but at that time had no broody turkey hens to put them with, as we kept only four to six turkey hens to where we now keep twenty-five or thirty. However, biddy raised us seven nice turkey pullets, and in the fall we sent away and got a fine long-legged young tom. We were not particularly proud of his long shanks, but as our hens were rather short-legged we decided to use him.

SOME OBSERVATIONS.

The next spring, while starting the flocks of poults sired by the long-legged tom, we observed that the long-legged ones came through the grasses wet by rains and the dews with only the lower part of their shanks wet, while the short-legged ones were wet almost to their throats and soon became droopy, and some finally died. This convinced us that shank and plenty of it is very essential in the turkey business, as a thorough wetting under ordinary conditions usually proves fatal to a young turkey. That spring when the poults were hatched we debated whether or not we would put them with the turkey hens, but decided to, as they always grow faster and larger when raised by their natural mother. To our great surprise, Madame Turkey was up by feeding time each evening with her brood, and from that day to this our turkeys have not even thought of staying out at night. It is all because those hens raised by the chicken hen were taught early in life to come to their coop at evening. Our M. B. turkeys now are as completely domesticated as we could wish them to be. They eat out of our hand and we can pick them up anywhere, old or young. Please remember we do not advocate rearing turkeys with chicken hens only in cases where they are inclined to wander too far and stay out at night; then we would advise this plan. You would not need to raise many with chicken hens, as only a few hens so raised would lead in a whole flock for two or three years if kept that long.

"To dress turkeys so they will show the golden yellow tinged with pinkish cream and command the premium prices on the eastern city markets, we keep them free from food for twelve hours; then hang them up to pick; then lock their wings by bringing one over the other and catching the tip of the upper wing over the tip of the lower. Then we thrust a keen knife down the throat and quickly draw it out, so as to sever the jugular vein. Then we quickly plunge the knife up through the roof of the mouth into the brain, and while the knife is in contact with the brain we give it a slight twist so as to paralyze the turkey and make it loosen its grip on its feathers. We then quickly remove the feathers, and when picked we catch the turkey by the feet with head near the floor and give them a quick jerk so as to throw out the blood that has accumulated in the throat. We then hang them up to cool."

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THE TURKEY EGG.

By Mrs. J. E. Gray, in *The Poultry Tribune.*

It is said the wild turkey hen lays from twenty-five to thirty eggs before wanting to set. They are smaller and less flecked than eggs of the domesticated turkey. The domesticated-turkey eggs vary in size, shape and number according to age and size of the hen. The pullet will lay from twenty to twenty-five eggs before becoming broody, while a hen from three to five years old lays from ten to fifteen, but they are much larger, and flecks or brownish-red spots, so characteristic of the turkey eggs, are much more evenly distributed. While we greatly admire a large well-flecked turkey egg, neither being large or well-flecked is essential in hatching, as it is not always the largest egg that hatches best, and the flecks can be entirely washed away.

There is always something fascinating about opening a basket of these beautiful eggs, whether they are valued at $1 per egg of $5 per dozen.

At this season many of the costly eggs are being shipped, some to take a long journey, others not so far. At any rate, we always feel that both seller and buyer have a responsibility in the transaction. The breeder sending out these expensive eggs should do all that is possible to help the buyer to get a good hatch. He has paid good money and is entitled to every consideration; besides satisfactory hatches are first-class recommendations; the buyer usually heralds it far and near, and if the stock grows into something worth while it is the best advertisement a breeder can put out. It is a business that if rightly and carefully attended to advances and spreads like a growing tree. In the first place, he should see that the breeding stock is strong and vigorous, and that the eggs come from stock that is equivalent to the prices paid for them; that they are strictly fresh, also that they are securely packed in light, strong baskets—we say baskets, because that is our choice article for shipping turkey eggs in. Nothing is more disgusting to a buyer than to receive a box or basket of eggs all broken and missing out of the basket. Last season we received a box of wild turkey eggs at a cost of $1 per egg. Imagine our disappointment on opening the box to find a number where cracked and broken. We set those that had the appearance of being whole, with but very little anticipation, in which we were not disappointed, for not an egg hatched. The jar had proved fatal to the germ. If these eggs had been well packed in strong baskets, our hopes would possibly have been realized. We have received eggs that were shipped hundreds of miles that were in as good condition as the day they were shipped; again we have had them come a short distance that were badly broken and unfit for setting, just from lack of careful packing.

To properly pack a basket of eggs, line the bottom and sides of the basket with a heavy matting of excelsior, wrap each egg in paper and then excelsior, and place as near the center of the basket as possible; cover with a heavy layer of excelsior, a paper over this, and sew a heavy

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piece of unbleached muslin over all. Write the address very plainly and label "Eggs for hatching," etc. We have packed eggs in this manner and sent them to California, and had reports that every egg hatched.

The theory that eggs require rest after being shipped seems to be exploded by some of our experienced poultrymen, but after we have paid from $5 to $10 for eggs we take no risk, and rest them just the same. After these suggestions have been carried out, and the eggs have been delivered to the care of the express companies, the responsibility of the breeder or seller is at an end.

It is the buyer's time now to "make good" his part of the transaction. We would advise the purchaser, when eggs are received, to handle them with care after their long journey; set them away in a room of the proper temperature, and allow them to remain quiet until all fertile germs may recover their natural position. The hen intended to incubate them should be placed in some secluded nest and should be well settled down to work before the eggs are given her; or a more safe way is to employ two quiet hens and divide the eggs between them.

If by chance any should get cracked or broken, if the membrane is not injured, a piece of court plaster, or even a postage stamp, can be placed over the broken shell and incubation continued. The hen under which the eggs are placed should be dusted freely with some good insect powder, as she will sit more quietly and is not so apt to break the eggs if not infected with vermin. We feel sure if this method was carried out by both breeder and purchaser there would be less complaint about poor hatches from eggs that have been shipped, providing they were strong and well fertilized.

HATCHING TURKEYS.

By H. B. Gregory, in *Farmers Review.*

Turkey hens, of course, make the best mothers for the poults. Chicken hens, however, will brood the poults quite as well up to a certain age, at which time the poults will begin to wander. If other broods of poults are with turkey hens, those with the chicken hen will often leave their foster mother and wander away with a flock of turkeys and stay with them.

When there is a chance for choice, hens that are two or three years old are the best to select for hatching the eggs. Remember the profit in turkeys is greater than any other fowl, as a rule, at least for market purposes, and their laying season being short, the eggs are most valuable. Therefore, in selecting hens we aim to select those tried and proved mothers. The continual strain of four weeks' sitting demanded for hatching turkey eggs is quite a trial of patience and endurance, and while many young hens do their part to perfection, it is safer to trust the task to older and more experienced hens if you have them.

Whether the eggs are hatched by turkeys or chicken hens, equal caution should be used to prevent the possibility of insect parasites of any kind being in or about the nest or upon the body of the hen. The main danger from mite and lice attacks is at the time the poults are hatched, but the

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best time to begin the remedy is to deal with the hen from the time she is set. The plumage of the hen should be dusted with insect powder close down to the skin, from head to hock joint, being careful not to get it in their eyes. This should be done at least twice a week until within a day or two of hatching. The most careful attention should be given to this. Never use lime or sulphur for this purpose. Any good insect powder will answer the purpose if it does not contain ingredients that are harmful to the eyes. There is no kind of poultry more susceptible to the effects of unfavorable conditions, such as lice and mites, than young turkeys. I believe there are more turkeys lost each year from lice, mites and inbreeding than from any or all other causes. It sometimes occurs that the hen has not been properly treated for lice and mites, and they will be found on the young, and in order that the poults may live and thrive they must be freed of these enemies. As soon as the young are ready to leave the nest they should be examined carefully for lice, which may be on top of the head, under the throat or about the wings or vent. Some of them are gray and are difficult to see. They can be destroyed by the use of sweet oil, rubbing a very small amount upon the head and throat, under the wings and near the vent. Insect powder, however, may be used for all parts of the body except upon the head and throat. It is very important that only a small amount of the oil be used, as too much is injurious and may kill them. If you have no sweet oil, lard is very good. Take about as much as the size of a pea for each small turkey. Be sure there is n't any salt in the lard. Kerosene should never be used to kill parasites.

The first feed should be bread soaked in sweet milk. Squeeze the bread dry before feeding, and never let it sour, as it causes bowel trouble. The second feed is some hard-boiled egg mixed with the bread and milk, shell, and all broken fine. Not too much egg should be given, and never feed it alone. I have had the best results by feeding one egg to five turkeys in one day, and dividing the egg into three feeds. Feed them five or six times a day when small, and never any more at a time than they will eat up willingly and clean. If any food is left, the next time you feed them be sure and clean their dish and throw it away, and do not give them quite so much at the next feed, if they leave any. Never feed them wet or sour food or slops. Poults are seed-eating chicks, not slop eaters. I always feed them the egg until a month old. When about a week old I begin to feed some small grains or cracked corn or wheat; oatmeal is also very good. I mix some of it with the egg at times, in place of bread. Oatmeal is one of the best bone-and-muscle forming materials there is. Sprinkling a little black pepper in their food two or three times a day is very good to prevent bowel trouble. If you see any signs of bowel trouble in them when so young, it is either caused from being chilled, dampness, tainted food or overfeeding, and in that case add a little more black pepper.

E. F. Barry, in *Successful Farming:* About the middle of February or the first of March the turkey hens will be looking about for a nest, and every encouragement should be offered them to use the brood rooms as nesting places. Part of the rooms, at least, should have the nest fronts put in place and clean nesting material furnished. Replace all doors that have been removed and fasten them partially open with a long wire hook; in this way the nest is more secluded.

The nests should be watched closely, especially if the weather is cold, the eggs removed as soon as laid, and china or medicated nest eggs put in their place. All hens that are ten months old or over should begin laying. The eggs may be placed in wheat bran or meal, small end down, resting a little slanting, and if kept more than a week or ten days turned partly over each day. The temperature of the room where the eggs are kept should be between 50 and 60 degrees.

Mark on all eggs the date when laid, number of pen, also number of hen's leg band. It will hardly be safe to set eggs over three weeks old. Older eggs, together with infertile ones, will make good feed for the young poults.

The hen will lay from eighteen to thirty-five eggs before wanting to sit. When there are several hens ready to sit at the same time, at the end of the first litter, part of them may be broken up, and will lay again in about two weeks. The hens allowed to sit may be given from fifteen to eighteen eggs, according to size. An incubator should be started at the same time with sufficient eggs so that each hen may be supplied, together with those she hatches, with about twenty to twenty-five young in all. This is a much better plan to follow than to set them under chicken hens. Incubators don't breed lice, hens do.

Only hens that get their first hatch early can rear two litters during the season, excepting in a warm climate; even then late-hatched turkeys will not make the growth they should before market time. It is not advisable to try to rear young turkeys in a brooder; it's not practical. Even a common chicken hen does not have success in rearing young turkeys like the turkey hen. The domestic hen, instead of foraging for feed, expects to be hand fed. They also leave their young to shift for themselves too soon, and have altogether a different disposition from the turkey mother.

In case some hens hide their nests outside the stockade, they should be removed to one of the brood rooms when ready to sit. When the turkey mother has been given her clutch of eggs, a dish of wheat and another of water should be placed in the brood room and the door closed; here she is safe and can not be disturbed. Still she is privileged to leave her nest at will to secure food and water. The real value of the individual brood coop can not be estimated until it is tried.

It requires from twenty-seven to twenty-nine days for the eggs to hatch, and during that time the sitter will give no anxiety or trouble, excepting an occasional dusting with insect powder and to see that she has plenty of food and water.

During the first twenty-four or thirty-six hours after the chicks are hatched they should not be disturbed; naturally they need no food during that time. Prior to their being fed, enough chicks from the incubators should be added to the family to make up a flock of twenty to twenty-five; this change had better be made in the evening after dark. The following day the mother turkey will no doubt leave the nest with her young and give the little fellows a chance to stretch themselves. At

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this time the nest front may be removed and the old nest cleaned away and fresh fine-cut straw or chaff put in its place, sprinkled liberally with insect powder. The chicks now may be fed and watered for the first time, a very little feed at first, but gradually increased, feeding all they will eat at a time until they go on the range, where they will secure most of their food.

The advantage of the brood coop will now be realized more than ever before, especially if the weather is stormy, for here the mother and brood are safe from all harm and have sufficient quarters to be comfortable until they are strong enough to follow the hen on the range. A week or ten days after hatching the hen may be given the liberty of the stockade, and in this way will become accustomed to returning to her apartments; this is quite important. As much as possible, encourage the brood to retain the coop in which they were hatched, and when old enough to go to roost the perches may be put in place. These they should use until they are large enough to use the regular roosting quarters.

The manager must to a certain extent be governed by circumstances, but in every case insist that the birds, old and young, occupy the stockade at night, where they will be safe from all harm.

Some breeders have trouble with the gobblers fighting during the breeding season, and advise keeping one shut up while the other is with the flock, changing them frequently. This trouble is not general, especially when the flock is large, as often from ten to fifteen gobblers are allowed to range with hens with no particular trouble from this source.

Just before the breeding season begins the sharp toenail of all gobblers should be pared off smooth. not close enough to make them bleed, to prevent tearing the feathers from the hens' backs while mating. Often large gobblers seriously injure the hens during this time of year. This precaution should be taken to prevent the trouble.

NATURAL METHODS WITH TURKEYS.

By C. M. Barnitz, in *Successful Farming.*

There was a day when big, red-headed turkey gobblers spread their fantails, sported their crimson cravats, shook the noodle on their nose and sassed you from nearly every farm yard gate, but they met the nature faker, the turkey undertaker.

The turkey, the king of the woods, can not be denaturalized and live. Put that down. He is but four centuries from the wild, and is now semi-wild, while the chicken has been scratching in back gardens and making fusses between neighbors for over three thousand years.

The great Creator never intended that Mother Turkey should become an egg machine to lay eggs for small fowls to hatch, nor was it purposed that her place as mother was to be usurped by the common hen.

Go back to nature if you would have this grand bird survive and again inhabit our 6,000,000 farms on which now only 7,000,000 turks are raised. Yes, study the wild turkey, his natural environment, food and habits, and then raise your turkeys *a la* nature.

The northern and Mexican wild varieties once so abounded, north and south, that the renowned naturalist, Audubon (1780-1851), tells us that big wild gobblers were sold at six cents apiece with but few takers, but this natural resource for replenishing the blood of our flocks has been almost destroyed to feed the gullet and the greed of man.

We have taken this fowl from the forests and made him a polygamist, for the wild tom in the spring love season generally chooses but one female and, as if by mutual consent, the pair separate in the fall, going their chosen ways and selecting new affinities in February or March.

Here is nature's tip not to make parent and offspring brother and sister, but to head the flock with a vigorous unrelated gobbler each season, or if a male at least equal to the present cock can not be obtained, to change the hens—a move not often made by many farmers, who hold to the old tradition that a new male is the sum-total trick. The turkey tom should be secured from a distance, for one thing that has destroyed the turkey industry has been the indiscriminate trading of stock by farmers, the roaming breeders, unknown to their owners, pairing in the fields, so that over large areas turkeys have become inbred—the great curse of the turkey tribe.

How about wild blood? Wild blood is best to infuse, but to get it—there's the rub. Most of it is like that which was sold to a California gun club to restock the state with wild turkeys. The wild turks didn't act like strangers. They coaxed feed from the rangers and roosted on the mangers.

One strong male to six or eight hens is about right, and as a whole clutch of eggs, or a season's output, is fertilized at one pairing, one gobbler should run with the hens, as two will fight and interfere with each other and no poults result. Rough-house in laying season puts the hens on nerve and often cuts the egg output. There is controversy as to the best age for breeders. It is not a question of age, but of strong maturity.

The wild turkey, with all its natural advantages, might perfectly mature in a year, but we claim that turkeys in domesticity, except in exceptional cases, do not mature in a season, and thus we prefer to mate only birds that are two to three years old, matched evenly as possible. If mating old birds and young, it is far better to mate a strong yearling tom to old hens than an old gobbler to pullets, the latter mode being responsible for much mortality and weak stock.

It is better to start with stock than to buy eggs for hatching. With stock you know ancestry, eggs are fresh, and you have good old Mother Turkey to hatch, brood and rear the poults—nature's copyrighted way to success.

Autumn is the best time to buy stock, and good birds are worth good money. Five hundred dollars was recently paid for a Maryland turkey gobbler. The purchaser thought the best none too good when it comes to working out problems for profit in flesh and blood, and he was right. You need not pay $500 for a good breeder, but here's our rhyme; take it in time.

Cheap stock is a stumblingblock. In the fall breeders sell lower than in spring, come right off range and are not overfat, the great handicap to success. There was a day when turkeys were almost a drug on the

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market; but now behold the turkey famine. Only 7,000,000 turkeys for 95,000,000 hungry turkey lovers, and every one yelling, "Turkey—gimme turkey!" Funny state of affairs in a country, the natural habitat of the bird, where once gobblers gobbled in nearly every barnyard.

"It's blackhead," cries one. Yes, that misnomer, blackhead, eats up a lot of government appropriations in official wild-goose chases after microbes. It's the cloak that covers the sins of omission and commission of turkey nature fakers.

This country has been put into the turkey graveyard class by the inbreeding and ill feeding of turkeys. Excess of carbohydrates kills millions of turkeys. *Corn is the great turkey killer.* A turkey's weak spot is the liver, and corn hits the spot sooner or later. Excess of carbohydrates causes that mushy, nasty, yellow diarrhea and that sleeping away to death.

But wild turkeys live mostly on protein—the blood, muscle, life-giving principle. Wild turkeys, pheasants, quail aren't flabby and fat as butter at the end of winter—not by a long shot. Yet these birds, that severe winter reduces almost to skin and bone, go to nesting and hatch strong offspring from every egg.

Here are a few tips for turkey breeders:

Separate them from market stock and feed them differently; keep them normal through winter by judiciously feeding a grain ration, in litter, of equal parts red wheat, barley, oats and corn. Waste apples, beets, turnips, cabbage (a moderate amount), and tender sprouted oats should be fed for greens; good beef scrap or fine fresh-cut bone should be substituted for worms and grasshoppers, while steamed alfalfa or clover, mixed with bran and "mids" and moderately salted, will be relished. The aim is to give variety, to copy nature, and just enough should be fed to keep them right, and they should be examined occasionally to guard against overfat and for lice, Persian insect powder being best for the pests.

Grit, charcoal, shell and fresh water should always be before the birds, and a comfortable shed should be provided, into which they should be driven in severe weather. "Birds of a feather flock together." We modify that old saying: Birds of a feather should not only flock but feed and sleep together.

Government experts declare the blackhead microbe is incubated in the digestive tract of the chicken. Therefore, keep your turkeys away from the greedy, bughouse hen, off of rotten ground and the oozy manure pile, away from the red-mite hen roost, and feed them alone on clean ground.

In selection, especially note vigor, shape, size, color. By size I do not mean weight only. Two toms may weigh the same, but vastly differ. One may be big-boned and muscular and later develop into a giant; the other may be small-boned and fatty, grow no larger, fertilize no eggs, or beget weak offspring. Large-sized turkeys are not the market call; besides, experts agree that size comes from the female side.

Very large gobblers are not often good breeders. They tear the hens down the side, and these wounded hens, though successfully treated, quit laying, or lay soft-shelled eggs for the rest of the season. To pre-

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vent this trouble, real heavy gobblers should be shod with the ordinary cotton gloves, the rear toe being left free so he may clutch the roost.

The turkeys in pictures are models. The gobbler is large in frame; body long and deep; neck and tail long and graceful; back broad and descending in graceful curve to tail; breast full, round and broad; wings large and strong; head, caruncles (cravat), feet and thighs large; shanks thick, long, straight and well set.

The hen is a fine mate, but, of course, being a female, is more refined than the male, as all females are.

These turkeys are Bronze. Bronze is best. The American Mammoth Bronze is the result of a cross of a northern wild gobbler and a Mexican wild turkey hen. Of the seven varieties, it is largest, most vigorous and most popular, and is conceded by all to be the best on earth.

Finally, breed turkeys, breed more turkeys—yes, breed them *a la* nature for success.

THE FIRST WEEKS OF A TURK'S EXISTENCE.

By G. E. B., in *Farm Progress.*

The raiser of turkeys has an anxious time of it during the first six weeks of the turkey's existence. Apparently they make every effort to die during this period.

The little turks begin growing quill feathers from the very first week. The drain on their energies makes them weak. This is taxing on their systems, and they have to be fed carefully and well or they fall sick and die. Some growers clip off the early feathers in order to stop this drain upon their growth.

Dew and wet weeds are menaces to the turkey's existence. They should be allowed to run in yards or over fields where the grass is short, and it is a good plan to keep them up of mornings till the sun has dried off the dew. Dampness of any kind is nearly sure to kill a few of the brood.

The young ones should not be fed during the first twenty-four hours after hatching. A little sand mixed with their first food may help their digestion. Hard, stale bread soaked in skim milk makes about the best feed possible for the first meal.

It is necessary to fight vermin from the start. They should be dusted frequently, and if the birds can be allowed to safely roost out of doors it will be much better for them. Swelling of the head is often noticed in these birds when they are allowed to roost indoors. Dust the old hen very frequently in order to kill any mites or lice she may have, and examine the young ones frequently for signs of vermin.

Cleanliness is very necessary during the time when the little fellows are being kept in the coops. A dirty floor, a dirty drinking vessel or dirt anywhere else in the immediate neighborhood of the turkeys means the possible sickness of all these tender young birds. All filthy holes in the yard where they run should be filled up, and the drinking vessel should be washed out daily.

Turkeys may be hatched under the barnyard hen, but they will do much better if they are hatched by their natural mothers. The turkey hen understands better how to take care of them. Overfeeding is another thing that is sure to cause trouble. Better let the turkey hen supervise their ranging, and she will keep their appetites sharp. It is better to feed small amounts and feed often than to gorge and distend the crops of the young turkeys.

If handled gently and fed at night at a regular hour the flock will learn to come in from its wanderings at nightfall, and it can be better taken care of if the grower knows just where to find the regular roosting place.

Dampness, vermin and indigestion are the three greatest enemies of the turkey raiser, and all these strike hardest during the first six weeks of turkey life. Most of these fowls become extraordinarily hardy and enduring as soon as this dangerous period is safely passed.

FEEDING THE LITTLE TURKEYS.

From *The Rural Home.*

A practical farmer says:

"We never feed young turkeys until they are twenty-four to forty-eight hours old; then we give them such a small amount it can scarcely be called a feed. One thing we must always remember is not to overfeed them, for they are very greedy little fellows, and if allowed all they could eat they would soon die.

"We throw some fine grit or oyster shells in the pen as soon as we put the turkeys in. They will pick at this while the old turkey is eating a liberal meal of shelled corn. Our first feed for the little ones is stale bread, wet with milk and squeezed dry; for this we always use whole sweet milk. If we have no stale bread on hand we give cottage cheese, made by putting thick sour milk on the stove until curd sets, then turning it into a cheesecloth sack and letting it drain until it is very dry. Enough can be made at one time to last one or two days.

"This cheese is the chief feed for the poults until they are about three or four weeks old; then we commence to give nice, sweet corn meal; do not use it if the least bit sour. We mix the meal into a stiff dough, using sweet milk. We also have used shorts in the same way with good results. We feed our little turkeys, while they are in the pen, about every two hours. We give plenty of fresh water at all times in perfectly clean dishes. Milk we consider a very fine feed for our turkeys all through the summer months. We also give it to the breeders in the breeding season: We use creamery milk exclusively, both for curd and for drink.

"After the poults get large enough to stay in the field all day we give a small feed in the morning with fresh water in their troughs, then we do not feed again until night, when they all get full feed with milk and water to drink. As they grow older we add wheat to their bill of fare. We have used the prepared chick feed offered in market, but after a trial of several kinds we like our own mixture of curd and corn meal best, as the little fellows seem to do best on these and grow faster.

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"If we wish them for breeders we feed very sparingly of corn until the weather begins to get quite cold. Barley we consider very poor feed for turkeys if given oftener than three or four times a week, and then only in small quantities. We have learned that barley fed to our flock of turkeys in the fall after thrashing will kill them; that is, if fed exclusively, as is often fed to cockerels to fatten them while they are on the range. We feed our breeders corn during the winter months, as we think they need it to carry them through the long winters of our northern climate. They are allowed to roost out of doors all winter, and only on very stormy, cold nights do they seem to stay in the shed we have provided for them, inclosed on three sides, but left open on the south side. We find that by letting them roost out of doors they never contract colds or get the roup."

YOUNG TURKEYS NEED NO WATER?

By E. H. McDonaugh, in *The Feather.*

I raise turkeys, which of all domesticated fowls are the nearest to wild fowls, though perhaps I should except guineas. The turkey is never tame, at least not for the whole year round. She may come at your call and even eat out of your hand, but as the breeding season approaches all the native instincts of untold generations of wild turkeys come to the surface, and in her nesting habits and in the rearing of her young she recovers—if given half a chance—the forest sagacity and native cunning of the unhoused and the untamed.

After a few seasons' experience and study of the best authorities on turkeys and turkey raising I went to studying the bird herself. I watched her and followed her and investigated her ways in the woods as I would have watched and studied any wild bird. I came to the conclusion, in consequence, that the mother turkey knew more about raising her young than I or any other human being did. I have therefore gradually given up all the time-honored theories that I had imbibed from other turkey raisers and from books, and now take advice from no one but the turkey herself. In so doing I have eliminated nine-tenths of the work, much of the expense, and increased my profits greatly. Moreover, I never have a sick turkey.

In raising turkeys we let nature take her course, for with good, sound foundation stock the turkeys raise themselves. Instead of interfering with blundering human "help," I just endeavor to keep on visiting terms with the birds, which during spring and early summer are practically wild woods creatures. A part of the time I formerly spent in housing, dusting, greasing, feeding and watering the young I now spend sitting on a log or in the grass studying them and watching the mother train her young to care for themselves. I no longer feed the growing turks, I just give them a daily taste of fine grains to keep them tame enough to come when I imitate the mother's call, and to make me a welcome visitor in the haunts they choose for themselves. They do not come to the farm buildings unless badly frightened, until the gregarious instinct that formerly led the wild turkeys of America to unite in immense flocks in the fall brings them up to roost in the trees with others.

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To return to the question of water to drink. I have found that young turkeys have a wonderful capacity for doing without it. The last place the turkey mother apparently thinks of taking her young is to a stream or other drinking place, though the lusty, downy fellows can swim before their slower brothers of the same hatch are out of the shell. This statement may be questioned, but I am not mistaken.

All notions to the contrary, neither are damp and wet nor rain and dew fatal to young turkeys, or even harmful. At least this is true of White Hollands. When I raised the more common breeds I followed tradition and protected them—neither have I seen them swim. But I have known my white fellows to swim out of the nest more than once when rains and floods had made the nesting place an island.

Yet the old turkey does not seek drinking water. They doubtless get moisture from the wet earth as they collect sand and grit, and may be seen reaching for the drop of dew on a grass blade, but as for taking a real drink of water they do not seek it for several weeks at least. I have had a turkey hen steal her nest in a dry wood lot, where there was no water obtainable except from rain and dew, and keep her entire flock there until half grown. These poults thrived without water. Their insect food contains much moisture, as well as the vegetable food they enjoy.

For some years we have been withholding drinking water from the poults we are occasionally forced to raise by hand or chicken hen. If by some mishap we are obliged to house them, their first meal consists of a piece of sod with its damp earth and grit and grasses, and possibly ants and insects. If possible to get them out on the grass, we give no water at all the first week, and if the earth is damp, dew abundant and insects plentiful, furnish no water at all in dishes. When old enough to wander about they are at liberty to go to a little running stream at will.

PREPARING TURKEYS FOR MARKET.

From *Poultry.*

A mistake which turkey breeders often make is to market immature specimens for the Thanksgiving trade when by keeping them for the Christmas market they could realize a much better profit. It is seldom, indeed, that turkey breeders do not have late-hatched birds which are not up to weight by the time the Thanksgiving market opens, but if the price is anywhere near what the breeder feels he should have, he will sell all his turkeys except those he wishes to keep for next year's breeders. By doing this he often sells birds not more than three-quarters grown. These birds not only represent a loss to the breeder in the number of pounds he might sell, but it spoils the appearance of the whole lot. Immature birds do not bring the top price, and a few of them mixed with your fully developed birds might tend to reduce the price you will receive as a whole; in any event, they will preclude the possibility of your receiving a premium over the regular market price. It would be much better to hold these smaller specimens until the Christmas market, at which time they will have attained their full growth and can be

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fattened and sold at a substantial increase over the price you will have received in the Thanksgiving market. It is seldom, indeed, that the price at Christmas is not fully as good as it is at Thanksgiving time. We do not, however, advise that full-grown specimens be held for the Christmas market. They should be fattened and sold as soon as possible, for after a turkey is full-grown it is simply a waste of feed to keep them.

Go over the turkey flock carefully, selecting every fowl whose growth and condition are such that a few weeks of liberal feeding will convert it into a desirable, marketable article. Separate these from the remainder of the flock and provide for them a good-sized feeding pen, remembering that it is not practicable to confine turkeys as closely as other fowls. They are too restless, and must have space enough to allow them to work off a little of their excess energy. A shed or the lean-to of a barn that has been used for feeding cattle or sheep may be made to answer the purpose. An ideal place would be a covered pen having reasonably tight north and west walls, but whose other sides are inclosed with poultry netting. Such a pen allows the fowls almost as much air and sunshine as when on free range, while if judgment is shown as to the number of fowls the pen should accommodate, they will not suffer for want of exercise. Some low roosts, enough to accommodate all the turkeys without crowding, should be provided, and the feeding troughs should be so arranged that they may be removed for cleaning without the attendant entering the pen. The less confusion attending the work of feeding the better will be the results, for it must be remembered that turkeys are rather excitable fowls. For this reason it is well to have the pen in a quiet, secluded location, if possible. At least, endeavor to keep other animals away from the fattening pen, and guard the fowls from unusual or unnecessary noise and excitement.

Since only those turkeys which were hatched reasonable early and reared under favorable conditions will have attained sufficient size and maturity to make them satisfactory candidates for the Thanksgiving market, and since, as intimated earlier in this article, these fowls comprise a small proportion of the season's crop, it would seem advisable to prepare all such for market at this time, excepting only a few of the very best specimens, which every producer should reserve for breeding purposes. Three weeks or a little more of steady, systematic feeding is sufficient to put the fowls in prime condition, and this period is about as long as turkeys may be safely fed in confinement. Do not feed too liberally during the first few days of confinement, but after that they should have all that they will eat up clean. Good fattening foods are corn meal, bran, oats, barley, buckwheat and cooked potatoes. Not all of these need be fed, but the combination of two or more of them makes a mash which may be fed dry or wet. If moistened with skim milk the value of the mash is considerably increased, as skim milk is excellent for use in fattening poultry of any kind, a fact which appears to be better appreciated by English poultrymen than by those of this country. Many English poultrymen supply skim milk for drink almost exclusively during the fattening period. In the absence of skim milk, however, or where it is deemed too expensive, an abundant supply of pure, clean water must be given. Sharp gravel or grit must also be within reach

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of the fowls throughout the period of confinement. A plan favored by many is to feed the mash in the morning, and whole grain—oats, corn or barley—later in the day, the whole grain being first rendered more digestible by steaming in hot water. Where one is fitting turkeys for private customers or for a discriminating market, it is advisable to add a little pure fat, in the form of cheap tallow or suet, to the mash, since it has the desirable effect of softening the flesh and rendering the carcass more juicy.

PROFIT ON TURKEYS—DRESSING AND MARKETING.

By A. E. VANDERVORT, in *Successful Poultry Journal.*

A turkey is as much an essential part of the annual Thanksgiving celebration as liberty is of the life of the people who originated and yearly proclaim the day. The eagle is the national emblem, but the turkey is first in the hearts of the people during the holiday season, and it is at this time of the year that the market is best for selling the turkeys. Not every turkey is fit for the feast; a turkey is a turkey only when it is a good one. Out of the carloads that are hurried to the large cities during the two weeks preceding Thanksgiving, the dealers select only a small per cent which can be sold as "fancy." This small per cent is the flower of the season's offerings. They are from the hatches of the previous spring, have made a steady growth and uniform development, and have been sent to the market well fatted, dry picked and presenting an attractive appearance. These are the birds for the possession of which dealers strive and wealthy purchasers go to the bottom of their pockets. The poultryman who produces such quality need have no mortgage on his farm, nor bring up his children without the advantages of an education. If he can arrange to dispose of his product direct to the customer, he can pocket the dealer's margin and sometimes obtain extreme prices. A glance at the market stalls in any large city will reveal the reasons for these conditions; the market is plentifully supplied with ordinary turkeys, but the plump, yellow-skinned, well-fatted and carefully dressed birds are notably absent. If this quality is so much in demand and commands such high prices, what is the cost of producing it over that of producing the ordinary grades? Very little! It simply requires a little more good corn consumed and a little more painstaking care when dressing and shipping to make the difference in their value equivalent to several times the slight increase in cost.

To produce this high quality in your turkeys, young ones alone fill the requirements. Their rapidly grown, quickly fatted flesh is sweet and tender, and if grown on the range, where most of their food is secured in a natural way from nature's stores, it has a flavor which can not otherwise be obtained. The best way to fatten turkeys is not to confine them, but they should be fed all they will eat before leaving for the range and when returning at night. The youngsters will take to the range after eating and get enough exercise to promote digestion while engaged in securing the fresh vegetable and animal food needed to properly balance their ration. Corn and wheat make the best fattening foods.

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Turkeys intended for market should be dressed and forwarded in time to reach their destination a few days before Thanksgiving. Late arrivals are seldom in as great demand or realize as high prices.

MANNER OF KILLING AND PLUCKING.

Before killing the stock should be kept for eighteen hours in a clean, airy pen and given no food. They may have water up to within eight hours of the time of killing, for water gives a healthy look to the skin and assists in cleansing the digestive organs of matter which would become sour and taint the flesh. A short, stout stick, a long, sharp, steel knife, and a strong arm and a quick hand are required for the operation of killing. The bird should be suspended head downward, with its feet in a noose of strong cord, far enough from the walls of the house and other objects so that it can not injure its wings when it struggles. After stunning by dealing a sharp blow at the base of the skull with the stick, pass the left arm around the body of the turkey under the wings, holding the side of the breast towards you. Grasp the head in the left hand and open the bill with the thumb and fore finger. Thrust the knife blade in through the mouth to just back of the brain and make a sharp cut directly across the roof of the mouth, severing the arteries. Hold the bird firmly with the left arm and hand in the same manner, and begin at once to remove the feathers with the right hand, beginning at the juncture of head and neck and working up over the breast and body. Then give the bird a turn which presents the back to the operator, and begin at the neck or between the wings and pluck towards the tail. The short feathers of wings, tail shanks, and neck are removed next, and the long feathers of the wings and tail, if removed at all, are plucked last. As a rule, the feathers of the last joint of each wing are left on and are much appreciated by the purchaser of the bird to use about the kitchen. The skin of a turkey is less likely to be torn than that of a chicken or duck, but one should be very careful in the work of removing the feathers. The thumb and fore finger do most of the work by firmly grasping a few feathers and removing them by a quick jerk, which begins upward toward the tail and terminates outward, which movement is accomplished by a quick twist of the wrist. This method is less likely to tear the skin. Careful handling after picking is very desirable, for a bruise will cause discoloration, which is detrimental to the appearance of the bird.

WASHING AND COOLING THE CARCASS.

After picking, the bird should be cooled by hanging it in the open air out of the sun; if the weather is cool, long enough to allow the escape of all animal heat but not long enough for it to freeze. After drawing, the feet and head should be washed clean and wiped dry, and all blood removed from the throat and mouth. If care is used when killing and handling it will not be necessary to wash the body of the bird, and the skin will retain its bright yellow appearance better than if dampened or cooled in water instead of the air.

PACKING TO SHIP.

All consignments should be packed tightly, not jammed, in clean boxes, and sufficient packing put in before the cover is nailed on to prevent shifting en route. Birds of different sizes, but not of different quality,

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may be packed in the same box, and the contents of the box should be correctly marked on the outside of the cover. Large boxes are inconvenient to handle and less desired by small dealers than boxes weighing from 100 to 150 pounds. Before placing the birds in the boxes, especially for the fancy trade, the heads should be cut off and the skin drawn forward over the end of the neck and tied with clean string. Each carcass when thoroughly cooled should be wrapped in clean wrapping paper and packed at once. Paper without much color should be used, or at the end of the journey the color will be found to have colored the skin.

No exceptional ability is needed to figure that there is money made by properly growing and fattening, and carefully plucking, packing and shipping turkeys; and one can well afford to study his market closely to find just what it wants and when it will pay most for it.

"Birds are so constituted by nature that they require an abundance of fresh air for health and vigor. They never do well on a limited supply of air. For this reason all coops and boxes in which poultry of any kind is kept in the summer should be as open as possible. Let the roof be tight to protect from rain, but let at least one side be open for the admission of fresh air at all times. The open side may be protected by wire cloth or other material that will let in the air, but keep out rats and other vermin."

If I were going to preach a sermon on turkey culture, I would take "How not to feed" for my text. Three-quarters of all diseases common to the turkey are caused by overfeeding, says a writer in *American Agriculturist.* It is expensive and useless to be continually throwing out something for them to eat, for indigestion soon follows, then droopy wings, rheumatism and numerous other diseases, all of which are caused by overfeeding and too close confinement. Provide them with a green pasture; alfalfa is best, but anything green will answer, and let them forage for themselves. They will consume myriads of grasshoppers and other insects and leave the pasture in better condition than they found it. In fact, they are a benefit to any farm as insect destroyers.

"Young turkeys should be fed nothing for the first thirty-six hours after hatching, then they may be fed some cottage cheese, pure, fresh water and fine grit or sand. They should be fed small quantities of this five or six times a day. A cake made of corn meal and water and milk and baked until thoroughly done, then mixed with a little chopped onion, is also good. They are very fond of sour milk, and I always try to provide it once a day after they are three weeks old, but my principal food for growing turkeys is cottage cheese seasoned with a little pepper. One of the greatest mistakes of would-be turkey raisers is overfeeding. Where one turkey dies of starvation, ninety-nine die of overfeeding. They are great foragers and require but little feed after the first of July, providing, of course, they have free range like most farm flocks have."

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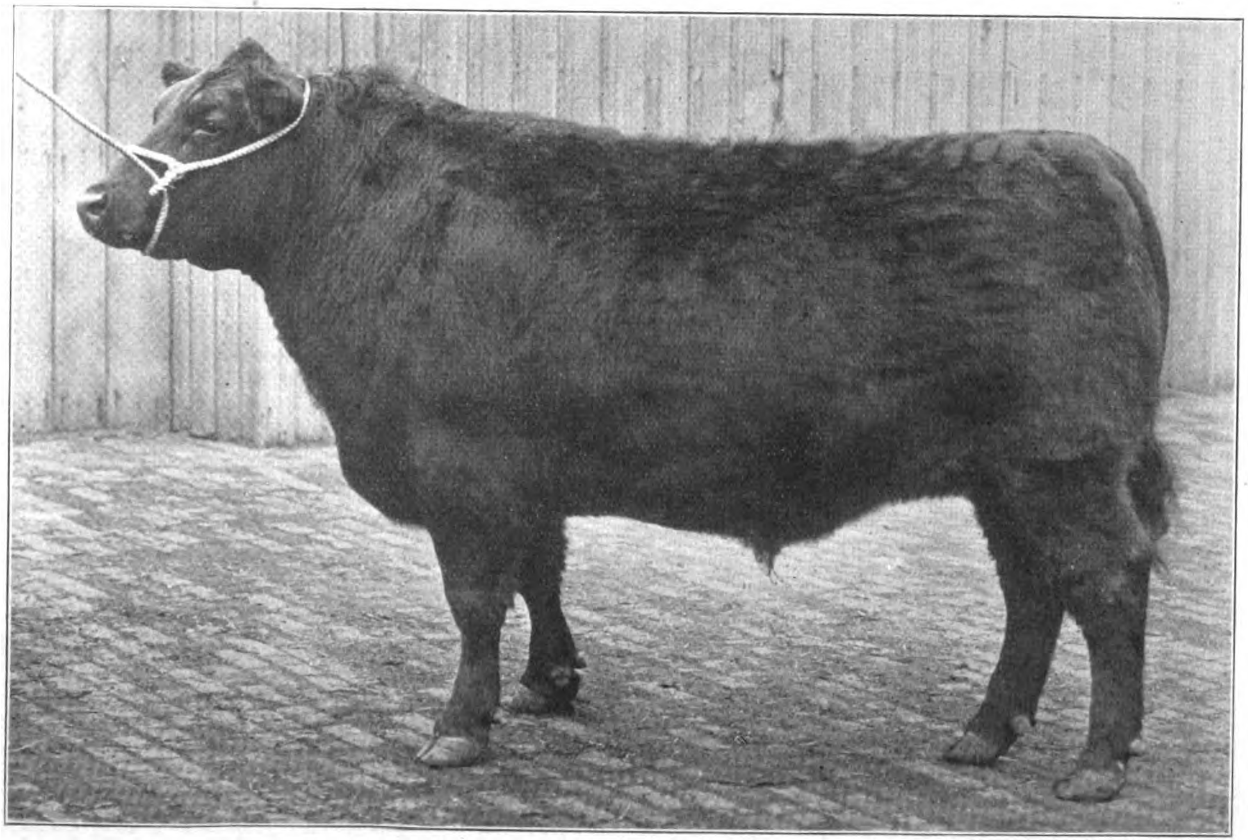

GLENCARNOCK VICTOR, Grade Aberdeen-Angus.

Grand Champion steer at the International Live Stock Show, Chicago, in 1912.
This steer was grown and fattened without any corn whatever.

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Part IV.

Educational Problems of Rural Life.

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EDUCATIONAL PROBLEMS OF RURAL LIFE.

THE SCHOOL AS A SOCIAL AND CIVIC CENTER.

By RICHARD R. PRICE, Director of Extension Division, University of Kansas, Lawrence, at the Board's forty-first annual meeting.

This is an age of the building of schools. There never has been a time in our history when there was so much pulling down of old schoolhouses and building of new ones as now. Moreover, additional new buildings are being erected everywhere to take care of the increasing school population.

This tendency is to be observed everywhere, east and west, north and south, in the country and in town. The movement for the consolidation of rural schools and the formation of union high schools has done much toward bringing about the erection of new and sightly and well-planned buildings in the country. The same result has been brought about in the town through the congestion of population centers, requiring additional school facilities, and the consequent aggregation of large amounts of taxable property, which provide the funds for buildings.

The erection of large and fine school buildings is a more marked characteristic of city school systems for the two reasons already mentioned—congestion of population and the abundance of funds. This is a characteristic that is likely to become more rather than less pronounced in cities for two reasons: the drift from country to city is going on at an increasing ratio, so that crowded school conditions will become increasingly prevalent and will demand more and larger buildings; the character of the education provided is covering so many phases of activity and is becoming itself so many sided that it now takes a bigger and more expensive plant to provide the necessary facilities and equipment. Perhaps it would be well to give more details about these two points.

In 1880, 22.5 per cent of the population of the United States dwelt in cities of 8000 or more inhabitants; in 1890, 29.2 per cent; and in 1900, 33 per cent. It is confidently expected that the census of 1910 will show this percentage to be between 40 and 50. And this movement from the country to the town is not a phenomenon confined to this country. It is true all over the world, and it will probably continue until the city has the power of the majority. The coming civilization, unless conditions change, will probably be a civilization of cities. Enough has been said to show why there has been extensive building of schoolhouses in the cities to keep pace with the rapidly increasing school population. The pressure has also been increased by compulsory attendance laws, so that the total term of years of the average person's schooling has been much lengthened. The result, at any rate, is that in many cities of this coun-

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try schoolhouse building never ceases from one year's end to another, and yet the facilities are never quite adequate to the requirements.

To add to the perplexity and increase the expense, schoolhouses are vastly more complicated than they used to be. The buildings themselves now express quite adequately the complexity of modern education. The plain brick building, with its belfry, its tall, narrow windows, its simple classrooms and its sheet-iron stove is becoming antiquated. It is already obsolete in the cities. Now we must have a fireproof structure with an elaborate heating and ventilating system, automatically controlled. The windows are in banks, the walls are properly tinted and the seats scientifically adjusted. But in addition to the facilities of the old schoolhouse we must now have a gymnasium with shower baths; a sewing room with its proper equipment; a wood-turning room with power lathes and band saws; another room with work benches for joinery and cabinetmaking; a room for forging, casting and pattern making; a drafting room with tables and instruments; a cooking laboratory, with kitchen and dining room. We will make no further mention of the various scientific laboratories and of the assembly room for concert exercises. Suffice it to say here that all these requirements of the new education demand larger buildings and much more expensive equipment than did the schools of twenty-five years ago, or even fifteen years ago. It may be added that the outside architecture and ornamentation has kept pace with the inside adequacy of equipment, so that now many city school buildings can challenge comparison, architecturally, with the best of other public buildings, whether city or state.

The Moseley commission, which came over from England a few years ago to investigate our educational system and to make comparisons with the English system, made some very keen and penetrating observations on the conditions here. The members were lost in admiration of our splendid buildings and of the general distribution of educational advantages and opportunities. But one adverse criticism should not pass unnoticed here. They asked if it were not possible that we are spending too large a proportion of our educational means for buildings and equipment, and not enough on adequate salaries for teachers. After all, the teacher, not the building or the equipment, is the vital factor.

Here, at least, is something to think about. Would it not be better, as an educational policy for the future, to make our buildings adequate but a little more plain, and the equipment substantial but not so costly, and to devote the money thus saved to making the salaries of teachers not only adequate but even generous?

It is generally admitted, I believe, that the United States has in use and under construction the finest buildings for public-school purposes in the world. Any one who has kept track of these matters for the last ten years will also believe that Kansas is well up with the average in this respect. Now the question arises, Is the United States in general, and Kansas in particular, getting a proper return for the enormous amount of money invested in the school plant of the country? This does not necessarily mean a return in dollars and cents, but it does mean a return in some kind of value or service commensurate with the amount of money spent. Americans are a practical people. If we find that we are not

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getting proper returns on our investment we must adopt the method of the efficiency engineer in dealing with a similar problem in a large factory, and find out wherein is the waste and the loss of power.

The school plant of America is valued at one billion dollars. The public-school plant of Kansas, outside of the state institutions, is valued at twenty million dollars. It is fair to assume that the full use of this property is worth to the community 5 per cent upon the money invested. The full use of the plant, then, is worth to the United States fifty million dollars a year; to Kansas alone it is worth one million dollars a year. Now let us see how near the people come to getting the full working use and value of their plant.

In Kansas, as in most of the United States, the school year in the towns and cities is nine months of twenty days each. The school property is in use, therefore, during 180 days out of the year—not quite half the time. Moreover, during those 180 days the property is in use only from about 8:30 to 4:30. During the evenings the windows are dark, the doors locked, and the grounds empty. Indeed, it is by no means a rare thing to find an edict forbidding the children to play on the grounds after school. Hence much playing ball in the street, broken windows, tracked-over lawns, mutilated flower beds, irritated neighbors, rowdyism and town rows. But this is a digression.

It is estimated, taking into account the loss of time afternoons and evenings, Saturdays and Sundays, and the long summer months, that the school property of the country is used only about 40 per cent of the available time. This means that there is an annual waste in the United States, through lack of proper development and use of this valuable property, of $30,000,000, and in Kansas alone of $600,000. Think of it! A 60 per cent waste in Kansas, amounting to $50,000 a month. As a matter of fact, these estimates of waste, far from being overdrawn, are too low, since no account is taken of the village and country schools with a school year of seven and eight months.

A manufacturer who would put up an expensive plant, running into hundreds of thousands of dollars, and then operate it for only 40 per cent of the time, would soon have the probate judge sitting on him. Certainly his fixed charges would eat up not only profits, but also capital.

On the contrary, such a manufacturer crowds his factory along for every available minute in the day or night, for idle time means to him a money loss. He attempts to use his entire plant constantly and at the maximum of its productive efficiency. If one small machine has to remain idle for a few minutes at intervals because it does not receive its material fast enough from another machine, the owner will gear up the entire factory so that all the machines may work all the time at their maximum capacity.

If the money loss and waste to a community through the inefficient use of the school plant were all, that would be bad enough. But who can estimate the subtle, unappreciated and immeasurable loss and waste in other ways? What of the boys who become rowdies and hoodlums, or grow up without a proper sense of civic responsibility, for the lack of supervised playgrounds, and gymnasiums, and reading rooms, and debating clubs? What of the girls, whose evening resort is the picture

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show or the public dance hall, and who grow up, at the best, frivolous and light-headed, at the worst, street-walkers, all for the lack of a place where they may go to hear free lectures and take part in entertainments, folk dances and indoor games? We hear much these days about the conservation of natural resources. What is the matter with conservation of our boys and girls? The conservation of vital human resources?

I would not confine my remarks under this head to conditions in the cities and towns. The same problem confronts the rural community. We are exercised, and properly so, over the alarming drift of young men and women from the farms to the cities. It is probable that the causes for this drift are economical as well as social, and are too complex to be remedied by single or simple means. Moreover, we must not condemn this drift as unqualifiedly bad. The city needs for its development the young people from the country, and many of them will do better there than on the farm. Many bright pages of our history would be missing or obscured if in the past young men had not been attracted to spend their energy and their genius in the city rather than on the paternal homestead. On the other hand, however, it is also true that many of the young men who go to town would do better for themselves and for the country to stay on the farm. It is for this class that we must make favorable conditions and attractive surroundings in the rural districts.

One of the drawbacks that we hear the most about, with reference to life in the country, is the dearth of social advantages. All work and no play makes Jack a dull boy, on the farm as well as elsewhere. Youth is unconquerably social in its instincts, and provision must be made to satisfy in a healthful and legitimate way the natural craving of the youthful heart for social diversion. What has taken the place of the husking bees and the quilting bees and the spelling bees of a former generation? It may not be possible to revive these old-fashioned merry-makings under changed conditions, but if not, other things must be devised to take their place if we are to keep the young people contented. And why not make the country schoolhouse the center of a healthful and self-sustaining and self-sufficient rural life? There is no other building so convenient, none so well adapted to the purpose, none so truly the people's own. There is no good reason why this building should stand dark and empty every night, when it might be ministering to the varied social and civic needs of a truly democratic community—democratic because it meets in neighborly spirit for social diversion and entertainment and culture, or to talk over common problems in a community-owned building.

And here just a word of caution. It will not do to devote these gatherings entirely to discussion of matters pertaining to the farm. The lawyer and the banker in town do not carry their business into their social evenings, and neither should the farmer and his children. Let literature, art, music, philosophy, education, economics, sociology—all make their contribution to that culture which is the rightful heritage of the people of the furrows and pastures as well as those of the streets and offices. I deprecate the present tendency to narrow and circumscribe the mental horizon of the country people by confining their entire attention to the means of livelihood. There are bigger things in this world than business, whether in town or country. Therefore, let not all your discussions be of animal husbandry, or corn breeding, or soil fertility. Let us have place for the things of the spirit.

A gross materialism is the death of true community spirit, whether in town or country. It is well to raise bountiful crops wherewith to feed starving bodies; but is it well to be content with that? What are we doing for the starving spirit? Luxurious country homes, automobiles, telephones and rural free delivery alone will not keep young people in the rural community. Country life must be made self-sufficient by providing for the soul as well as for the body. When the country provides the things craved by the soul as well as it now furnishes bodily comforts, the rural problem will cease to be. Opportunity to satisfy many sides of their nature young people must have. Lacking it in the country, they will seek and find it in the city. The fruits and flowers of civilization, as well as the bread and meat, must be provided for the young people of the farms. They crave the cultural and idealistic side of life as well as material prosperity. Too many farmers look upon art, music and literature for their children as mere luxuries, whereas these things are necessities if the rural community is to maintain a stable and well-balanced life. This problem must be tackled seriously by country people, and its best hope of solution lies in the more extended social and civic use of the schoolhouse.

We have long ago learned that it does no good merely to root out weeds in a garden. If we are to prevent the growth of noxious plants we must not only pluck out the weeds, but also sow in their place the seeds of the useful and profitable crop which we desire—fill the place where a weed grew with a useful plant.

So it is with the cultivation of boys and girls. Nature abhors a vacuum. A negative program will not do; a constructive program is necessary. It will not answer to forbid the boys frequenting pool halls and smokehouses; you must offer them another place for companionship and social pastime. It is folly to put the ban on picture shows and dance halls for girls unless we have something better to offer as a substitute. In other words, youth has a natural and unconquerable desire for companionship, games, entertainments and social intercourse. This desire may be dealt with in two ways. The old way was to repress it and choke it out by laws and regulations, so that it ceased to manifest itself openly, and found its gratification in secret and illicit fashion; the new way is to guide and direct and control this natural and entirely innocent instinct by providing suitable places for young people to meet, under proper supervision and chaperonage, where they may play games and enjoy harmless and instructive entertainment and amusement. We must bear in mind that natural instincts suppressed in one form are likely to reappear in another and, perhaps, more vicious shape. Let us cease repressing and begin guiding and directing and training.

Here comes in the need of a broad, constructive program for the use of the school plant. Let's *wear* out our school buildings rather than permit them to rust out or rot out. We need to take a broad-gauged view of the possibilities of social service inherent in these public buildings, and make our plans accordingly. The public owns the plant, has made a

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very heavy investment therein, and is entitled to a dividend in the form of maximum efficiency in use and service for the upbuilding of the people, whether it be along the lines of education, government, recreation, entertainment or physical development. A wider and more thorough use of the school plant is what the future is going to demand and is going to get. These buildings will no longer be for the education of the young exclusively; they will be for the education of the entire people. And in the latter case education will not be confined to "book larnin'," but will include lectures, debates, public discussion, concerts, as well as the physical education of sports, games, and athletic training. The guiding principle should be that whatever does not interfere with the primary purpose of the schoolhouse in any way as the place for the formal teaching of the young, but does tend to bring people of all ages together in social groups for self-improvement, culture, recreation and social service, to the advancement of the ideals of good citizenship and brotherly love, has a place in the modern schoolhouse. We must re-create the neighborly feeling of the "little red schoolhouse" in the twentieth century environment and atmosphere of haste and tension.

We must get a new view of education and the educative process. Education does not, must not, cease with school days. Education is a continuous process of adaptation to environment. Our modern civilization is an enormously complex thing, and men and women who are to assume its burdens and direct its progress must be given the knowledge whereby they can act intelligently. This can not be poured into them. They can assimilate it only by coming in contact, either directly or through the reports of others, with the various phases of the world's activity—this accompanied by free and full discussion. The play of intellect against intellect and of wit against wit is a fine mental gymnastic. Enlightenment and firmly based conviction are likely to emerge from the arena of wordy argument. It is good for a man to have firm convictions, but it is better to be able also to give a reason. The neighborhood social club, with it locus and habitat in the conveniently located schoolhouse, and with its regular meeting night, where social, political and economic problems may be discussed pro and con in a free and friendly spirit by friends and neighbors, is a powerful factor in molding public sentiment aright and in bringing about an intelligent public opinion.

Now, how shall this principle of the free use of the schoolhouse for the good of the public be carried out in a practical way? In the first place, why not use these buildings for voting places? This has often been done in the country; why not in the town? Election days do not come very often, and it would do no harm to dismiss the schools on these days and allow the children to observe their elders performing one of the most important duties of citizenship. I believe there would be an educational value in thus bringing one of the processes of government to the immediate notice of the boys and girls in our schools. The saving in the expense of hiring polling places would be very considerable in many towns. It is barely possible, also, that the tone and atmosphere of the average polling place would be improved by the new location.

Other social uses of the schoolhouse are almost too numerous to mention. One has only to follow the program now being carried out in the school buildings of Rochester, N. Y., or Cincinnati, to realize the far-reaching possibilities in the full use of the school plant.

The first and most obvious extension of the use of the schoolhouse is in the direction of night schools. In every town of any considerable size there is a class of young people who have been forced by economic pressure into the ranks of the wage earners before even their elementary education has been completed. Others have finished the grades, but lack the advantages of high-school studies. Many such persons are ambitious for an education, but must spend their days in making a living. For their benefit a night school should be regularly maintained, open three or four evenings every week, so that the heavy handicap these workers are under in the race of life may be somewhat lightened.

Vacation school should keep the plant working all summer. This would give pupils who for various and legitimate reasons have fallen behind in the regular session a chance to catch up. The problem of retardation in the schools would thus be greatly simplified.

These are the more obvious extensions of the use of the schoolhouse and are in line with the regular routine of school work. But what may be called the social use of the schoolhouse extends above and beyond all this, because it makes of the educational center a social center and a community center.

The story of what has been accomplished along these lines in the cities already mentioned is as fascinating as a romance. Nor are the possibilities yet exhausted. New chapters are being added to the story year by year, and as new cities take up the idea new features are added to the original plans. Wisconsin, that laboratory of social experiments, is already adding the traveling moving-picture show with educational films. And why not? Whatever is educational in the broadest sense of the word should have a welcome in the schoolhouse.

In the towns where the idea has taken firm root that the people's buildings must work full time in the people's interests there is something going on at the schoolhouse day and night. Every ward school building is a neighborhood clubhouse and community center, where the sweet and wholesome influences are generated which produce feelings of solidarity and mutual helpfulness and coöperation. From these elements are woven community spirit and the ties which knit men's hearts each to each in brotherly endeavor to attain a common civic ideal.

Evening and vacational schools are taken as a matter of course. Every afternoon at the close of school and all through the summer months the playgrounds teem with child life drawn from the streets and alleys. Here the children play happily, with none to molest or make them afraid, with no policemen to drag them before a judge for disturbing the peace or destroying property. They are not only permitted to play; under wise and competent supervision, they are *taught* to play. And by a strange coincidence, the number of cases before the judge of the juvenile court seems to decrease in direct proportion with the increase in the use of the playgrounds.

There is a myth current that the boys and girls in small towns, villages and rural communities are not subject to corrupting influences. And

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yet the police of all the great cities inform us that the criminal is recruited by a great majority from the rural districts rather than from the city slums, as we are inclined to believe. They tell us that more deviltry is hatched and more young people started on the downward path at the village pool hall or livery barn, or at the crossroads gathering place of country youths, than in any city slum. Well-informed people now quote with approval the saying that God made the country, man made the city, but the devil made the small town. A newspaper man, whose name, if I should mention it, would be well known—a man who came himself from a small town and who is well acquainted with the conditions in town and country all over Kansas—told me recently that if he had his way about it children in any community would be forbidden to play together except on a regularly organized playground with a supervisor in charge. That was this well-informed man's opinion of the corrupting influence of unregulated and unsupervised intercourse and companionship of all sorts and conditions of young people. Plays and games are health-giving for the body and have a fine tonic effect on the mind and spirit. Mere loafing or idling or dawdling companionship are enervating and prone to lead to viciousness. But despite our opinions to the contrary, young persons do not play together well naturally. They have to be taught. For this, equipment helps. And the schoolhouse, whether in town or country, is the place where such activities should center.

In cities where this work is organized the building at night shows light in every window. In the basement gymnasium classes are in full swing, the different ages and sexes at different hours. The shower baths invite to cleanliness. In the reading room upstairs a branch of the public library has been established. Here some people are reading books and magazines, while others, who may not have a suitable place at home, are studying lessons. In one part of the building are girls' sewing and cooking classes, while in another part the boys are learning joinery and carpentry. In one room the ward or village improvement society is meeting. In another the young men's debating club is having a heated discussion of the tariff question. In two or three other rooms, at the same time, societies for girls and women of different ages are having a meeting. At a later hour in the evening all these groups may adjourn to the assembly room to hear an entertaining or instructive lecture, perhaps illustrated with lantern slides. On another evening the floor may be cleared and the young people have folk dances and games. All this is simple and wholesome. It is also democratic, for it binds the people together for the accomplishment, not of private gain, but of public good.

What I have said so far has dealt mainly with the needs of young people in town and country, and has therefore emphasized the social and educational use of the school building outside of regular school hours. But there is another and more inclusive function of the social center, which, to the minds of many people, is most important of all. This function is performed in bringing together in the opened school building the mature citizens of the community of all political complexions and of all shades of religious and social belief. This is accomplished usually by the organization of civic clubs, meeting in the schoolhouse on stated nights. The importance of this is hard to overestimate in a society constituted like ours in this country.

We are not a homogeneous people, and we do not, for many reasons, amalgamate as readily as we did once. Moreover, we are now to an unusual and dangerous degree developing class spirit and arraying one class against another. Our society is becoming stratified, both horizontally and vertically. And the pity is that we have not provided opportunities or organizations for bringing people together as simply "folks" and citizens of a common country.

Our political parties are exclusive, for they draw together only those of a certain political belief. They embrace only part of the people, and hence are called parties. If the Republicans hold a political meeting the Democrats stay away, or else attend only to scoff. The same is true reciprocally if the Socialists or Democrats held a meeting. There is no common ground. Again, we are divided by church preferences. The many denominations and sects gather apart somewhat exclusively, and there is comparatively little crossing of lines. Race lines make further divisions. The French, Germans, Italians and other races making up our national life tend to draw into groups. Time will not permit me to show in detail how we, as a society, are cut up by lines of wealth, education, social position and other artificial barriers. A very grave danger to the cohesion of our society is now threatened by the widening chasm between labor on one side and capital on the other.

Yet all these groups and sections and cliques have a common interest and a common ownership in the ward or town or district schoolhouse. Through their children they can be brought together; they can be induced to cross race lines and church lines and party lines; they can meet on common ground to discuss common problems in an atmosphere of friendship and broad human interest. For, after all, the main thing is to get acquainted. After that, suspicion and hostility soon become impossible. The greatest function of a community school center is to cultivate the spirit of neighborliness among all sorts and conditions of men and women—and that means the development of a real community spirit.

The people are taking the functions of government more and more into their own hands. Commission government for cities, direct primaries, the initiative, the referendum, the recall—these are all tools fashioned for the hand of democracy. They may be good tools, well adapted for their work; but the all-important question is, How will the people use them? Will the people be reckless and shortsighted, or will they exercise prudence and vision? Different opinions have been expressed by men whose belief in the power and intelligence of the people to govern themselves well varies with their own temperaments. But one thing is perfectly certain. These powers of direct rather than delegated government and legislation are going to demand for their proper and wise exercise an unusually intelligent and well-informed citizenship. A citizen who is called upon to initiate legislation or to cast his ballot in a referendum on matters of grave and far-reaching importance to city, state or nation is actually legislating, and must be informed on the subject. He can no longer lightly cast the responsibility on his member of the council or legislature, or on his representative in Congress.

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How are citizens to get this requisite knowledge of public questions and public affairs? Obviously, by free discussion and debate on public matters of current interest. There must be an open forum somewhere in which citizens of all shades of belief may get together, not as partisans, but as citizens, and discuss subjects of common importance. The schoolhouse is the best place for this, because it is the people's property, paid for by their money, and controlled by no party or sect. Free speech, open public discussion, is an essential of true democracy and lies at the basis of political intelligence. Yet there is now no place provided to which citizens may resort to talk over things. The nonpartisan, nonexclusive civic club, meeting at the schoolhouse in the evening, furnishes just the opportunity and the occasion where each man may have the right, and even the duty, to express his opinion. In this way one opinion modifies another, and common wisdom results. It will not do to dismiss the matter in cavalier fashion and say, "If they want a place in which to talk over things let them go out and hire a hall." That will not do. It must be made easy, not hard, for people to get together so as to foster an intelligent and wide-awake public opinion.

It need not be assumed that citizens will necessarily meet in a school center to discuss matters of grave national import. It is more likely that they will meet as a ward improvement club, to discuss sewers or paving or street lighting or the finances or management of the city, or a score of such questions that lie close to the home and fireside. And what an opportunity such an organization would give city officers and other representatives of the people to appear and explain their policies, defend their records and outline their plans for the future. Officers could confidently expect that measures approved of by such a neighborhood gathering of common citizens would, when carried into effect, have behind them the weight of public sentiment. In a very true sense, Governor Hughes of New York was right when he said that such a wider use of school buildings is "buttressing the foundations of democracy."

Some alarm has been expressed lest such free centers of public discussion should be seized upon and controlled by radicals and extremists. Radical sentiments will undoubtedly be expressed, but such opinions are thus far less dangerous than when throttled. The experiences of the civic club meetings in the schoolhouses of Rochester, N. Y., showed that the members always were eager to hear both sides of every question, and never took hasty or radical action. They made good use of a hot political campaign by inviting representative speakers of the various parties to present their views and beliefs before this nonpartisan body. Prof. George H. Forbes, president of the Rochester board of education, testifies that "the movement vindicated the opinion that the average man is a conservative or a moderate progressive, and will take only one step at a time in the path of progress." Moreover, the unexpected fact was brought out that the most congested quarters of the city, housing a large foreign population, was thoroughly responsive to the civic spirit and showed marked intelligence and breadth of view.

The movement for the wider use of the school plant as a civic and social center has now become nation-wide. In October, 1911, under the

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auspices of the extension division of the University of Wisconsin, there gathered at Madison a notable assemblage of people interested in the new movement. There was in that gathering a quickening sense of the fact that the new use of the school building makes for "concentrated, constructive, coöperative citizenship." A national organization was then formed under the name, "The Social Center Association of America." The purpose was set forth as follows:

"To promote the development of intelligent public spirit through community use of the common schoolhouse and other public places for free discussion of public questions and all wholesome, civic, educational and recreational activities."

Among the resolutions may be found the following statement:

"The social center represents all the people in all those interests which are common to all. It is the people's forum and permanent headquarters for citizenship and neighborly spirit. In it the people come to know one another and how to make their government work. The public school plant now functions only in part. Its present service is parental. The social center makes it also function fraternally. Details of this wider use of the school plant vary with local needs, but its spirit is the Lincoln spirit."

The next conference of this national organization will be held in October, 1912, at the University of Kansas, under the auspices of the extension division of that institution. At that time we feel confident that another step forward will be taken in that great democratic movement of fellowship and sympathy and community spirit through which the common man is to come into his own. And in conclusion I can not forbear quoting that poetical message on the common man which Edwin Markham sent to the Madison conference:

"We men of earth have here the stuff
Of paradise—we have enough!
We need no other things to build
The stairs into the unfulfilled—
No other ivory for the doors,
No other marble for the floors,
No other cedars for the beam
And dome of man's immortal dream.

Here on the paths of every day,
Here on the common human way,
Is all the busy gods would take
To build a heaven, to mould and make
New Edens. Ours the stuff sublime
To build eternity in time!"

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EDUCATION AS AN INVESTMENT.

By Pres. FRANK K. SANDERS, Ph. D., D. D., of Washburn College, Topeka, at the Board's forty-first annual meeting.

It is evident that an educational question is a live topic at such a gathering as this. I noted with interest the able address of Mr. Fields, delivered last evening, in which he argued for a larger relative investment in elementary education, particularly in the country. I find myself in hearty agreement with the proposition that a well-developed common-school system is essential to a progressive state. I particularly believe that the time is ripe for a reorganization of our present educational system so as to provide for elementary and grade and high schools of the highest character and value in country and town alike. The line of development for the immediate future in Kansas is in coöperative action. More consolidated school districts, with a few good schools in place of many poorly equipped ones, and more county high schools affording first-class advantages for the energetic boys and girls on the farms, are what we need. The work will be not one of creation so much as of extension. Our far-seeing superintendent of public instruction, Doctor Fairchild, has been a consistent advocate of this policy throughout his official term. Let the agricultural interests provide the means by which he may bring about such a development and it will appear with promptness.

I find myself in an opposite frame of mind in regard to the declaration that Kansas is practically wasting the $7,000,000 which she contributes annually to public education within her borders. I believe in the establishment of consolidated community agricultural schools, equipped with the necessary ground for experimentation and with a plant for teaching handicrafts and domestic science, but these should be managed as one plant with the existing or future county high schools, at a relatively low additional cost.

To have these advantages at the expense of the present adjustment of our school system, however, would be to inflict serious damage upon our state. We must make up our minds, rather, that public education is the best investment of public money. In place of $7,000,000 we must be willing to spend $10,000,000 or more.

As regards our common schools and high schools in the country districts, I can only speak as one who has to do professionally with a percentage of their graduates. Some of these are defectively educated, but the great majority of our country born and bred boys and girls at college are a credit to their county and their state. The real remedy for our educational troubles is to be found in the recognition of the fact that *elementary instruction must at all hazards be given by competent teachers,* paid as well as their high-school or college contemporaries, and enabled to devote their lives to elementary work. It is a pedagogical fact of real importance that some teachers are particularly adapted for dealing with the problems arising in connection with little children and small boys or girls. They know how to awaken interest and sustain it. They should make elementary work their profession, but not at the price of little or no recognition professionally and a meager salary. It is natural for us to think of university or high-school instruction as warranting the greatest dignity and the highest pay, but we should rather establish a generous scale of salaries, applicable in a fair proportion to all grades of the work of public instruction, and then work toward the permanent adjustment of teachers to those grades in which they can do their most effective work. This may considerably increase our educational costs, but it will be the sort of expenditure by which a far-seeing, broad-minded, enterprising business man turns comparative failure into sweeping success.

We are asking to-day in regard to the educational advance of the whole country, "Will it pay?" Whether we are having too much of a good thing is a lawful subject for thought. So clear is the desirableness of vocational opportunity in our schools that many are tempted to demand that all other types of training be put into the background. But while social efficiency is of prime importance and must henceforth be kept steadily in view by those who are responsible for the development of our educational systems, it is not the only objective of our educational activity. People need brains as well as sympathy and skill. The world is full of men and women with the best intentions who through sheer ignorance are a great hindrance to the common good. We need intelligent citizens, particularly those who can think, who are rational in their attitude at all times.

Education, as we classify it to-day, has a fivefold application or objective. We are recognizing physical, intellectual-cultural, moral-social, vocational, and purely personal. Those who decry the value of the education of to-day are usually thinking of one of these types alone. No system of to-day deals perfectly with them all, but is aiming to approximate such broad service.

First of all, the education of to-day aims *to develop a physically sound and mentally responsive being.* We are gradually discovering that most of our dunces should be sent to the surgeon rather than the schoolroom pedestal. Most of them have adenoids or defective teeth or weak eyes. When the physical needs are given attention, they are as capable of rapid mental growth as any child. This is the justification of a compulsory physical examination of all children in elementary grades, which ought to be recognized and provided for by the state in its own interest. A real defective should not be permitted to remain in the public school side by side with normal children; a defective of this sort should be speedily cured.

Again, the educational system of to-day provides for the *intellectual development* of the child. This is the most important objective of all. By such training we aim to develop a mentally alert, progressive man or woman, controlled by rational motives. Through such a type of education we transmit the culture of one generation to another and take advantage of our splendid national heritage. It was this sort of attainment that Jefferson had in mind when he declared that education was the safeguard of our democracy and the only wise preparation for citizenship. In a free republic we need an enlightened people, but we need even more the trained leadership of capable men, equipped to think through our pressing problems and give them wise solution.

But alongside of physical and cultural education, we aim to-day to provide for a *moral* and *social education*, which will establish right standards for the individual and right ideas of social service. Professor James once said: "Education is for behavior, and habits are the stuff of which behavior consists." It is a good teacher's business to guide the formation of habits which make one socially desirable and efficient. Professor Huxley's famous definition of education lays proper stress upon the moral element. "Education," said he, "is the instruction of the intellect in the laws of nature, including not merely things and their forces, but men and their ways, and the fashioning of the affections and the will into an earnest and loving desire to move in harmony with those laws." Instruction in the laws of things and their forces—that is science. Instruction in the laws of men and their ways—that is the humanities: literature, history, philosophy and ethics. Instruction in the fashioning of the will into an earnest desire to move in harmony with these laws—that is efficient moral and social training. Which shall we magnify? Which may we safely omit?

Prof. Walter Fiske, of Ohio, who has recently been studying the quality of high-school and grade-school teaching for boys, is a prominent advocate of the duty of the state to provide a more definite and wholesome scheme of moral instruction. "Early and mildle adolescence," he states, somewhat to our surprise, "is still the great crime period. The causes are not merely to be found in the failure of the home, but likewise in the ethical weakness of the public school." He adds the astounding declaration that the worst year in boyhood is the year after leaving school. The common methods of inculcating reverence, patriotism and enthusiasm for service are not sufficiently productive of results. We need to apply ourselves heartily to this grave and pressing problem.

Besides physical, intellectual and moral and social education, there are two more types which we are bound to cultivate. *Vocational training* is needed in our public nonprofessional schools, in order to develop that special skill which helps to make a man or woman socially efficient. We must give the guidance which will enable our boys and girls to be successful in the callings which they may choose, to be useful citizens, homemakers, bread-winners.

All this is beyond dispute. It justifies the demand for courses in business, in domestic science, in agriculture, in manual training.

Professor Strayer, of Columbia University, in a recent volume on "The Teaching Process," distinguishes a fifth educational objective which is often overlooked. I have termed it the purely personal aim. It is the training which prepares one for the right use of his leisure time. Such training is of supreme significance to all communities. It affects the contribution of every man or woman to the social, mental and spiritual uplift of the community, and influences the ideals and interests with which he is equipped. A few such men or women can revitalize the higher and finer life of any district.

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Doctor Holt, of Manhattan, has said with great power that the redemption of country life would quickly take place if a few well-equipped and educated graduates of our higher schools would settle down upon their farms for life, intending, when they had amassed a competence to stay upon the land and give their leisure to leadership. Thus would revive the old-time conditions, when the farmer delighted in his community life and detested that of the city.

Education is not a scheme for avoiding hard work, although not a few seem to think so. The educated man is one who is at some sort of work every waking hour. Education vastly increases his working capacity and endurance and raises the standards by which he judges it, and makes him a continuously active man. Moreover, education enables him to *apply that capacity* for the good of his community in manifold ways in the mastery of the problems of social life.

In a recent lecture on evolution given in the Washburn College chapel Professor Coulter alluded to the experiments now proceeding whereby our government Agricultural Department hopes to provide for the semiarid regions of the Southwest a corn or wheat which will quite certainly produce a valuable crop. Imagine the quick return that success in the experiments alluded to would achieve for a comparatively small educational investment of training, skill and time. How well we in this broad region would be repaid for a university or agricultural school costing millions per year, if these institutions could only produce occasionally a Luther Burbank or bring out a single device which would decrease the difficulties of home-making. Surely it is beyond dispute that an elaborated, well-supported educational system is the choicest investment of a state or community.

There was an interesting article in the December *World's Work* by Professor Neystrom, which set forth three tangible results of our educational system in this country. One was the *increased earning power* of a trained mind. Education has a value expressible in dollars and cents, whether we are thinking of business, of industry, or of agriculture. Commissioner William T. Harris once declared that where the public-school term was the longest, there was found the greatest average productive capacity. He instanced Massachusetts in comparison with the whole country.

The second tangible result is the *power of leadership.* In "Who's Who" are sketched 17,000 men and women, each one of some note. Seventy-one per cent had college education; 16 per cent high-school education; 9 per cent common-school education (mostly elderly people), and only one-fifth of 1 per cent self-taught. Our real leaders come from the educated classes. This is very significant when we recall the fact that, on the average, one in twenty passes from grade schools to high schools and about 1 in 100 gets college training. Yet 71 per cent of our successful men and women have had college training.

A third tangible result of education is its *influence on character.* The years spent at school are impressionable years. The contact with good books, helpful studies and high-minded teachers counts for solid and strong development. Society could afford to support a school system even if it were wholly unpractical. A school can not guarantee to every pupil

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an education; it can only give an opportunity. But beyond question it develops good citizenship, discovers fine qualities and forms good habits of life.

One other great value of education I may be permitted to add: It is the assurance of progress, of intelligent research, of clever invention. Only a skilled chemist can figure out the uses of by-products in manufacture that convert refuse heaps into gold mines. Only a trained man can lead us in scientific agriculture, no less than in good business procedure of any kind.

The late Mr. Crane, of Chicago, had a profound contempt for colleges and their output. But his own son went to Yale, and so does his grandson. I would put over against him the opinion of a great manufacturer, quoted by President Hadley of Yale University in his inaugural address: "I prefer," said he, "in my business college-bred men. They do not know so much at the outset as a young man trained in the school of experience, but they are able to discover the reasons of things. They are able to think, and before long they are in charge and the other man works for them."

In its heart of hearts this is the opinion of the average American. He with a long line of ancestry, dating back to Jamestown and Plymouth Rock, believes in education. He is proud of our splendid grouping of schools of every type. He is willing to pay his full share of taxation, in order that educational development shall be at its best.

The aggressive German empire of to-day is the monument of an earnest campaign of education. In 1806, after the disastrous battles of Jena and Auerstadt, when Prussia lay prostrate at the mercy of Napoleon, it was that far-sighted philosopher, Johann Gottleib Fichte, who from his professor's chair at Berlin made those noteworthy and epochal addresses to the German people which set forth the importance and scope of public education. The two great results of his evangelism were the Franco-Prussian war and the industrially efficient Fatherland of to-day.

We need a Fichte or a Luther in the present age to awaken us anew to the significance of a well-organized, far-ranging, finely equipped and officered system of education which will render service to the lowest and highest alike, giving equality of opportunity to all for happiness, usefulness, skill and culture, recognizing it as an inherent American right to have the chance to rise in state or society as high as ability or attainments permit.

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SCHOOLS FOR COUNTRY CHILDREN.

By John Fields, Editor Oklahoma *Farm Journal*, Oklahoma City, at the Board's forty-first annual meeting.

The first sentence in a most excellent bulletin on consolidation of rural schools, issued by E. T. Fairchild, your state superintendent of public instruction, more than three years ago, reads: "The most pressing educational problem to-day is the rural school."

And I am convinced that it is still the most pressing educational problem.

I shall not tire you with a history of the exceedingly slow movement toward developing real schools for country children nor shall I present arguments for the consolidation of small school districts.

If you have any real interest in the schools where more than ninety per cent of the boys and girls on the farms of Kansas—who helped grow the $282,927,188.34 worth of farm products last year, of which Secretary Coburn keeps us so well reminded, and who are helping care for your $251,632,488 worth of live stock this cold winter—will get their only education, get a copy of the bulletin which I have mentioned before you leave Topeka, read it on the way home, and wake up.

The character of the machinery which farmers have built for the education of the children on the farms of Kansas and Oklahoma, in comparison with the machinery which the people of the towns have built for the education of town children, is as a hand sickle to a header-binder.

Let me tell you something which happened just two weeks ago in Oklahoma City.

The Oklahoma Educational Association was in session. A friend came to see me, and in course of his visit said: "Fields, you should have been at the meeting of the rural teachers' department this morning." I asked him to tell me about it. He briefly summarized what had taken place, and gave me the details of the steps which were taken toward obtaining the balance of the public building fund for encouraging the formation of large districts for rural graded schools. We originally had more than $5,000,000 worth of public building lands; state institutions have already gathered in more than $3,000,000 of it.

"But," he said, "they passed that by two or three times, and would n't have taken any definite action if it had n't been for a persistent fellow who kept bringing it up. Each time he'd apologize for not being a good speaker, and then proceed to make a most effective appeal for the country teachers to do something to help country people get some of their own money for their own schools. And finally he was successful, and a committee was appointed to initiate an amendment to the constitution."

We mentioned many men interested in this movement, but were unable to identify this one. The only clue furnished by my friend was that "he is a red-faced, farmer-looking man and did n't wear any necktie."

I know thousands of Oklahoma farmers who fit that description. Some Oklahoma politicians call them "the bone and sinew of the nation" in their public speeches and "hill-billys" and "rough-necks" in their private caucuses.

He came in the next morning and, though I had never seen him before, I at once recognized him as the man my friend had told about. He told me of what had been done and of how hard it was for him to force himself to take an active part "in a big meeting like that." And I said, "Well, why did you do it?" He told me why, and I understood even before he started to tell it. Oh, how I wish that men in positions clothed with power and opportunity in Oklahoma and in Kansas and all of the states might see and feel and understand it too!

He made the race into the Cherokee Strip in 1893; just a boy with a wife and baby, a pony team, an old wagon, and a determination to build a home. And these, and two other children who have come since, have worked together, building the home, on their own land, eight miles from the nearest town. He knew he did n't need to tell me of the struggles of those eighteen years. And so he passed that by.

"The snow and ice were so bad I did n't dare take a team out," he said, "so I walked eight miles to the station to come down here to this teachers' meeting and see if we could n't do something. I'm teaching the school in our district. We've tried and tried to consolidate four little schools and get a good graded school like they have in town. And so far we've failed. But if we could get just a little of the money from the public-building lands that the state's been spending to build state colleges that our children can't attend, we could get the folks interested and have a real school.

"Why," said he, "I'm nervous all the time about the future. We've just got our home fixed about like we want it. At last I've got the farm well stocked—have twelve good Percheron mares that I'd hate mighty bad to part with. I'm just ready for real business. But if we can't bring a graded school to us, I've got to go to it.

"You'll keep on helping us try to get what's left of our own money for our own schools, won't you, John?" he continued. "There's thousands of other men in the same fix I am. Just when we get fixed to live we've got to move to some town where they've got good schools or let our children grow up in ignorance."

There was a tremor in his voice, and more than a symptom of an excess of moisture in those blue eyes, which never had ever blinked at the trials of the pioneer, as he concluded: "And I can't let them do that."

My friend who told me of what this man had done for the cause so vital to his continuing in the business of farming illustrates another phase. Before coming to Oklahoma he was a teacher in a high school in Illinois. Later he taught in Oklahoma. But he wanted to go "back to the land," and settled on a claim some ten years ago.

He took an intelligent interest in the problems of his community; organized a shipping association and made potato growing profitable; selected and improved seed of cotton, Kafir, and milo; laid the foundation for herds of pure-bred cattle and hogs. And in the meanwhile he kept trying to get his neighbors to join in the formation of a district large enough to maintain a graded school. He wanted his children to go to a school just like the children of all the towns attend, and was not con-

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tent that they should begin and finish their education in a one-room, ungraded school, just as ninety per cent of the children of the farms of Kansas and Oklahoma have to do. And now he's teaching again, and he is dissatisfied and discontented. That neighborhood has lost a leader. It has n't shipped a carload of potatoes since.

How often has this same kind of thing happened in Kansas? You may jolly people into going "back to the land," but they'll not stay there unless they find or can develop schools just like and just as good as they left in town.

It is conceivable that a state might make fair progress without any colleges receiving appropriations from the state treasury. But progress in a state without common schools is inconceivable. All of us, I hope, will agree to these two propositions. But what is the relative amount of legislative time spent in consideration of the two classes of schools, and the relative amount of state funds expended for the improvement and extension of each system? And why don't country people improve their school system and establish graded schools, as the towns do? Because the tendency of practically all legislation with reference to education is to make such a thing as difficult and unlikely to be done as possible.

You have a shining example in Kansas. I refer to your Barnes-high-school law. It provides that in all counties, other than those maintaining county high schools, the people may by a vote at a general election avail themselves of the following provisions: That all high schools providing such a course of study as will fit its graduates for entrance to the State University, and in addition thereto provide a general course of study, shall be supported by the county at large. It further provides that in such counties any pupil may attend any such high school without tuition.

Your state superintendent of public instruction says: "It would be difficult to overestimate the importance of this measure or the great good it has been to the state." He, I fear, has examined it from the standpoint of an educator, interested in education for education's sake. If he will consider it from the point of view of the farmer, ten miles from town and perhaps twenty or thirty miles from the nearest high school, to the support of which he must contribute, I am sure he will come to see that it is one of the chief barriers to the solution of what he calls "the most pressing educational problem to-day."

It removes the necessity for the well-to-do farmer to work for the development of a graded school for all the children of his community. It lessens the ability of those in poorer circumstances to improve the schools for their own children, by taking from them funds for the support of a high school which their children can not possibly attend.

The university folks put a similar law over on us in Oklahoma some years ago. But when we saw its purposes and tendencies the farmers of Oklahoma forced its repeal. When your legislature meets here in Topeka, appropriation bills for your state educational institutions are introduced. And as the session progresses, the alumni of these schools, the persuasive members of the faculties, and the boosters for the towns where the institutions are, all are marshaled in support of the measures.

Oh, I know that game, for I was a member of the third house during four sessions of the legislature of Oklahoma territory, and learned just

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how to produce the proper "educational atmosphere" which would help us bring home the bacon. But of all the legislative orphans, did you ever see one more completely deserted than a bill relating to the betterment of the system of country schools? There are no alumni; no faculty members, and no town boosters whooping it up for it.

Do you want to know how to solve this "most pressing educational problem"? Try money—it is a great solvent. If Kansas had spent one-tenth of the money which has been spent for the development of your system of higher education in an honest effort to improve the system of elementary schools, beginning at the bottom in the country and building upward, the rural schools of Kansas would now be a complete demonstration instead of a pressing problem.

The future of your state and its development is n't in the hands of a highly educated minority; it depends upon the average intelligence of all of its citizens. No state is doing its duty to its citizenship unless it spends at least as much money and effort for the improvement of the elementary schools at the very bottom—the country schools—as it does to build up the institutions for higher learning at the top. And at present no state is doing that. But they are coming to it, and they will.

Minnesota provides annual state aid to the amount of $750, $1000, and $1500 to different classes of consolidated schools.

In Oklahoma the prospect of $2500 toward the cost of building graded schools employing three or more teachers in districts of not less than twenty-five square miles in area has resulted in an increase of the number of consolidated schools from thirty to eighty-six in less than a year.

Get the money! Insist on being admitted to the full privileges of citizenship at appropriation-making time as well as on election day.

The National Country Life Commission placed first among the "great general and immediate needs of country life": "Effective coöperation among farmers, to put them on a level with the organized interests with which they do business." Did any of you ever try to get all of the farmers in your school district to do a very necessary and beneficial thing, each acting in harmony with the others, and at exactly the right time? If you have you'll understand me when I say that this conclusion of the commission is mere words; it sounds well, that is all.

Until the farmers of every township can and do coöperate, to the extent of developing schools for themselves of a kind which these same farmers will regard as equal or superior to the schools of the towns, all talk of effective coöperation in larger and more complicated affairs is idle. The success of organized interests depends upon the ability and inclination of each individual in the organization to perform his part of what is to be done, promptly and effectively. And the success of cooperative efforts among farmers must have its foundation laid in a higher average degree of intelligence; it can never come from a few highly capable and many mediocre men living in the country. Each year some of the capable farmers are forced, because of poor rural schools, to move to town to educate their children. And then they become town men.

The second "great need" discovered by the commission was: "A new kind of schools in the country which shall teach the children as much

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outdoors as indoors, and perhaps more, so that they will prepare for country life, and not, as at present, mainly for life in town."

I personally know more than a thousand farmers who were so dissatisfied with country schools that they left the country and moved to town. Not a single one of them wanted a school "which shall teach the children as much outdoors as indoors"; none of them objected to country schools because they prepare children "mainly for life in town." They quit the country because ungraded country schools don't effectively prepare anybody for life anywhere. And I have yet to hear a single farmer make an objection to the present kind of country schools based upon their failure "to teach the children as much outdoors as indoors and perhaps more, so that they will prepare for country life." The average farm boy and girl gets plenty of outdoor instruction on the farm; their great need is a system of schools which will give them a decent training in the fundamentals of education.

The agricultural colleges and experiment stations have done a great work for agriculture in the United States. Your own Kansas State Agricultural College has an enviable record of service worthily and honestly performed, which is constantly being added to under the capable administration of President Waters. But the bringing of the results of the stations' investigations to the people who most need to know them is the greatest problem of all. And here is where mistakes are now being made and further mistakes inevitably will be made.

A bill is before Congress providing for appropriations to aid the states to establish a secondary school of agriculture in each congressional district. A national organization is working for appropriations to pay for the services of county farm advisers. Numerous and sundry other plans are being proposed to help the "dear farmer" and stimulate the movement "back to the land."

During an experience of fifteen years in every phase of experiment station work, and five years as editor of a farm paper which strives constantly to keep its readers informed of everything which will help the business of farming, I have failed to find a single farmer with a decent elementary education who could not gather from the printed page and apply to his own work all that is practical and useful in the published results of the investigations made by the experiment stations. And from just such men as these experiment station investigators themselves may learn much. But the man with practically no elementary education, who has not been trained and does not possess the native ability to think connectedly and observe closely, can not be made to understand and apply these things, even if you place a farm adviser constantly at his elbow.

The country needs graded schools. In them agriculture and domestic science may be taught successfully to all of the boys and girls. And a little of these taught to all is bound to be vastly more effective in building up the agriculture of Kansas than the teaching of much of them to a few and neglecting practically all. Graduates of your agricultural college may find, as principals of such schools, jobs worthy of the best of them. There is no need of arranging to care for them in positions called county farm advisers.

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The boys and girls on the farms of Kansas are not getting decent treatment from your state government. They will not get it until the farmers of Kansas realize that in the spending of money for education, and in the tendencies of legislation with reference to education, they and their children are getting decidedly the worst of it. They will not get it until Kansas farmers realize that the chief business of a state legislature is to make appropriations, and until farmers do as others do—organize to get the money for their own schools. And when they do this, when no child living on a Kansas farm has less of opportunity for education while living at home than all of the children living in the towns of Kansas now have, then homes will be built and maintained in the country, crop production will increase, and every line of business, including that of dispensing higher learning, will prosper and expand.

THE STORY OF MY FARMER BOYS.

By WILL B. OTWELL, Editor *Otwell's Farmer Boy*, Carlinville, Ill., at the Board's fortieth annual meeting.

This is the second time I have ever been in Kansas, and I am going home and tell Mrs. Otwell that you have the blackest dirt and the whitest people I have ever seen in my life—outside of Illinois.

It seems a bit strange that I should have been asked to come so far to tell you about my troubles, but a number of years ago there came to my town a couple of gentlemen for the purpose of organizing the first farmers' institute ever held in my county. Senator David Gore was selected as president and I was made secretary.

Mr. Gore knew how to get lots of work out of young men, so he told me to get busy and arrange for the biggest farmers' meeting ever held in central Illinois. I thought I knew something about advertising, so I printed column after column of agricultural items in thirteen different county papers. I got up a fine program of music and recitations and speeches by noted farmers. I remember I had S. Noble King, of Bloomington, to talk about the draft horse. A. P. Grout was to discuss fat cattle. Mrs. Nora B. Dunlap, of Champaign, was to enlighten the women folks upon domestic science. The entire program was free, and I printed large hangers and put them in all the stores of my county, urging and beseeching the farmers to come out to attend their own meeting.

I told the janitor of our great Macoupin county courthouse to get those great iron doors open very early in the morning to accommodate the crowd of farmers that I knew would be surging around the building for admittance. You may have heard of our great courthouse, and you need n't smile because the governor of our state came down to Carlinville last summer and helped us light a match to the last one of the million-and-a-half-dollar bonds, and if we had n't been one of the biggest and richest counties in the state we never could have paid the debt.

I told the janitor to get those iron doors open very early to accommodate the great surging crowd; and if I ever told the truth in my life, when the president called the meeting to order at eleven o'clock that morning there were present the president and the secretary and the chaplain, and that was every blessed soul that was present. And the chaplain, bless his heart, got up and offered a fervent prayer for the officers of the institute. I tapped him on the shoulder afterward and said: "Parson, if you will, just pray for these old hayseeds that was n't there; the officers are doing everything in their power that they know how to do."

Well, next year I determined to fool the farmers. Farmers, you know, can be fooled just a little bit easier than anybody else in this world. So I went down to the printing office and produced a thousand pretty pink invitations, like letters, with square envelopes and gilt lines running crossways on the back, and put a two-cent stamp on every one to arouse their curiosity, and then, with another fine program of music and speeches and instructors, without money and without price, mailed them out to one thousand representative farmers of my county—with just about the same result as the year before. I promise you there were not to exceed twenty-four farmers in the hall at any session of the two days' meeting. Well, the president resigned in disgust, and they elected me to that honorable position. I determined at once to make or break the old chebang—though I did n't have far to go to break it—and set about upon this plan that I shall give you, and then you may be your own judge as to whether it has been of any good or not.

I sent to Iowa, Indiana and Illinois and procured twelve samples of fine seed corn, and then called into the parlors of the national bank twelve farmers that knew good corn, told them what my plan was, and told them to pick out the variety that was best adapted to our soil and climate. They worked four hours upon that corn, and when they had settled upon the variety I sent away to the originator of the corn, told him that I would give the corn away, and asked him to furnish it to me as cheaply as possible. He furnished me a number of bushels at the ridiculously low price of three dollars and fifty cents per bushel. I then got the boys up five hundred dollars in premiums, and advertised that every boy who would send me his name and post-office address I would send him a package of fine seed corn, all I could send in the mail for one cent—about three hundred grains. Five hundred boys sent for the corn and began scrapping for those prizes.

I did n't ask a single man to come to the institute that year. I told them they could politely stay at home for all I cared. I had done everything I knew how to do to interest them, without success.

The fathers and mothers fell right into line and donated the best spots on the farm where the boys might grow their corn. The boys plowed up the hog lots and the calf pastures and the clover patches down where the tile empties, and I verily believe they would have plowed up their mother's front yard if they had thought they could raise better corn.

The country correspondents fell into line and began telling how Tommy Jones had sent for his package of corn, where he had planted it, how he had cultivated it, and finally, that Tommy Jones had gathered his prize ears and hung them up in the smokehouse to dry, and that next week Tommy Jones was going to take his corn down to Carlinville to the great farmers' institute.

I did n't grow very enthusiastic about the plans and really wondered whether there would be a single boy at the institute with his ten ears of corn, but for fear some boy might be there, I sent to Jacksonville and secured Mr. W. H. Stevenson, now of Ames, Iowa, to be on hand, for fear some boy might be there with his corn. I told the janitor not to be in any hurry about opening up those iron doors, and he could make them crawl in at the windows if he wanted to.

Stevenson and I sauntered down to the courthouse real late that morning, and when we came in sight of those great stone steps that form the approach to our beautiful courthouse, they were literally honeycombed with farmer boys. They had their corn in tea boxes, soap boxes, tied up with binder twine, shoestrings, any old thing, just so they got their corn to the institute; and when I called that meeting to order at eleven o'clock that morning there were five hundred representative farmers in the hall. I knew I had solved the problem, so when the boys were bringing in their corn I was learning my lesson. I would ask a boy, "How do you like your corn?" "Pretty well." "How does your father like it?" "Father thinks it a little short on one end." Others thought it a little too sharp to feed the cattle; others thought the cob too small—could n't get quite enough corn around it; and I should say that one-third of the boys thought that in their soil they could grow ten bushels more of white corn per acre than of yellow. So I spent thirty days in Scott, Sangamon and Macoupin counties looking for a type of white corn that would measure up to the Illinois standard of perfection and meet the ideas of the boys. I finally procured one hundred bushels and culled it down to forty, and then got the boys up fifteen hundred dollars in premiums and told every boy that it would cost him five cents to get in the game this year. I explained what the nickle was for, because when you are dealing with boys you want to be explicit. You can fool an old man and patch it up with him, but you fool a boy and he is fooled for keeps.

I told the boys I would send them three times as much corn this year, so the postage would be three cents. The large tinned manila envelopes in St. Louis cost a cent, and I employed an extra girl in the office to take care of the corn boys, at another cent, and I was very glad to donate the corn.

Eighteen hundred boys sent for this corn and started their summer's work. I would have you understand that these boys were not working solely for the prizes. They were reading agricultural papers, studying deep and shallow cultivation, fertilizers, liquid and solid; and many a boy when the summer was over could show his father a few points about good seed corn.

There was lots of trouble among the boys. One boy from Virden wrote: "My Dear Friend—You need n't expect me to the farmers' institute with my corn, because mother's confounded chickens got in and scratched up every grain of my corn." Another boy, from Atwater, said the crows got his corn, and one from Shipman said the blackbirds

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got all his corn. Well, bless their hearts, I had prepared for the crow boys and the blackbird boys and the chicken boys, and the next mail took them another package of corn, and they were happy again.

I got the boys up some pretty nice premiums. I had a twelve-foot steel windmill turning round on the platform. Three-horse riding plows, two-horse and one-horse, and corn shellers and cultivators and rolling cutters, and a friend over at Monmouth kindly donated me a box of a hundred bars of washing soap. How I did hope that Mrs. Otwell's boys would win that soap! If you have any boys about three feet long running around your place you need the same identical thing. The institute was a tremendous success. There were twenty-four hundred farmers present at every session of the three days' meeting. They ate their lunches in their seats for fear they could not get into the room again. The schools over the county were dismissed. The business houses closed and the institute spirit and the boy spirit mingled in my old town as never known before.

The boys hauled their prizes home in two-horse wagons. In addition to the machinery, there were pedigree pigs and sheep and calves, and the miller of my town called me into his office one day and handed me a check for one hundred dollars, to be used as I saw fit. I went down to the national bank and told the cashier I wanted a hundred crisp, new dollar bills that had never been used, and then I divided them into one hundred one-dollar premiums. Do you know, I think that the boy who stands away down the line, one-hundredth from the first, is as much to be encouraged as the big, pampered boy who always stands at the head of his class.

So I pinned a dollar bill to the following note and sent it to one hundred boys who had failed to win one of the big prizes: "My Dear Friend—I am handing you herewith the dollar bill you won at the institute. I congratulate you upon your nerve and energy this long, dry summer. I hope you will be with us again next summer and that you may grow to be a good man. I am, sincerely, your friend, WILL B. OTWELL. P. S.—Please let me know if you receive this dollar bill. Otherwise I may think it has been lost in the mails." You ought to have seen the hundred letters I got from those one hundred boys. If you will drop into my office some rainy afternoon when there is n't much to do, I will dig down and show you one hundred letters that money could n't buy. One boy from Brighton wrote: "My Dear Friend—I received the dollar bill you sent me, for which I thank you. I am an orphan boy, nine years old. I live with my uncle and aunt, who are very kind to me. This is the first dollar I have ever owned in my life, and I am going to keep it just as long as I live for a nest egg." I wrote the boy as nice a letter as I knew how and filed his little missive away among the things that money could n't buy; and last fall when I was over at Bunker Hill making an old settlers' address a boy about four feet long clambered onto the platform, and, taking me by the coat tail, said, "Why, don't you know me?" "Why of course I know you. Who are you?" "Why, I am that little nest-egg feller from Brighton." "Why, bless your heart, I would have known you among a thousand boys."

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But I must not forget to tell you about the boy who won the sweepstakes prize. A firm in Chicago kindly gave me a hundred-dollar bicycle. I hung it from the chandelier above my desk, where it hung—the coveted prize of all the boys. I got a letter one day from a boy down at Chesterfield, who said: "Dear Friend—Please send my corn by first express. I am yours very truly, for that hundred-dollar bicycle." I was most afraid to learn who the winner would be, for I was most sure it would be some boy whose father lived on a big, rich farm; but when I found out the history of the boy who did win it, he turned out to be a poor little fellow who lived with his grandfather and grandmother out on Brushy Mound, on a white piece of ground that would hardly sprout butter beans. And when I went down the last night of the institute and dug this boy off of the back seat and stood him on my desk in his little, blue overalls and introduced him to that vast audience as the champion young agriculturist of my county, I tell you your governor of Kansas never received a heartier ovation, and never deserved it any more, either.

Such a display of white corn has never before nor since been seen at any county institute, and Professor Shamel, the judge, said he had never seen a display to equal it at any state fair.

I often told Mrs. Otwell that I hoped the time might come when I could do over the state what I had done in my county; and one day Governor Yates called me into his office and told me I had been selected to take charge of the agriculture for the state of Illinois at the great World's Fair at St. Louis. I told him I would be glad to if I could take my farmer boys with me. He informed me that that was the main reason for my selection. I got the boys up three thousand five hundred dollars in prizes. I wrote to twelve thousand country school teachers and sent the rules and regulations to one hundred and twenty thousand farmer boys.

Eight thousand boys entered the contest and began growing corn for the greatest exposition ever seen in the world. You who have touched elbows with a thousand boys or more can appreciate the interest in that summer's work.

In the fall the corn began coming to me in every conceivable shape, wrapped up in every way imaginable; but to the credit of the boys be it said that nearly all of the corn reached me in good condition. We unpacked it and spread it out to dry, and, when it was ready, wrapped every ear in a separate piece of paper and packed it securely in boxes and shipped it to St. Louis, where it was put upon two of the largest pavilions ever erected for the display of pure-bred corn.

We arranged the display in little pyramids of ten ears each, and over each pile we deftly drew a strand of ribbon. Above these immense pavilions we hung two green satin banners, with gold letters, "Grown by the Farmer Boys of Illinois." Then I thought how interesting it would be if every display of corn contained the photograph of the boy who grew it; and accordingly I wrote out to the boys to have their pictures taken quick and send to me at St. Louis. Eight hundred boys responded, and when I had fastened the eight hundred handsome photos to eight hundred exhibits it made a fine sight, I tell you.

I had a long-distance call from eastern Illinois one day, and when I went to the telephone booth the man said: "You have my boy's corn at St. Louis, but yesterday we took the little fellow around to the brow of the hill and covered the blue grass over his grave. Would you like to have his picture to put on his corn?" And when it came I took a Market-street car and went down to D. Crawford & Co.'s big store and had a pretty little ebony frame put around it, and then took it to the ribbon counter and told the girl the story of the boy, and that I would return in an hour and would like for her to have it fixed up pretty nice. She draped it with strands of white and black satin ribbon and in each corner of the picture she put a little bow of ribbon. I took it out to the fair grounds and stood it up beside the little pile of corn; and if there was one there were two hundred thousand hard-fisted old farmers who would cast their eyes over the entire exhibit and then fasten them upon that one little spot, and after a moment's pause take out their old bandanas and go ambling on down the aisle, thinking—I knew what they were thinking, for I had thought the same thoughts a thousand times myself.

Two million people stopped to admire the concentrated efforts of those farmer boys. Forty thousand teachers visited this exhibit; two hundred thousand boys registered their names in passing. I have furnished the plans and pictures of this exhibit, on request, to England, Germany, France and Scotland and to nearly every state in this country. The United States government published a pamphlet on the farmer-boy work and distributed it all over the world.

My object in it all was to build a foundation upon which could be erected a structure more enduring than the world's fair, so that when the fair was over the farmer-boy work would go on until it had encompased the entire country.

But you want to hear about the last corn contest, just closed. It was the greatest of them all. Twenty-seven states were represented. The contest was upon single ears. The first boy got a thousand-dollar farm, and ten others got a fifty-dollar town lot each, and thirteen hundred others got small prizes. Sixty girls won prizes. The ears came to me in two-horse wagonloads, with the sideboards on. It was the finest pile of bundles I ever saw. I did n't know there was so much carpet chain left in the country. "Any color, so it's red," was the slogan of the boys, and enough red carpet chain was wound around the ears to reach the top of Lincoln's monument and back to Carlinville. One ear was wrapped about three hundred and sixty-five times. Binder twine, shoestrings, flax thread, ribbon of all shades, lace, bed cord, rubber bands, every conceivable sort of tie stuff, was used. There was enough cotton to make enough comforts to keep a whole orphanage warm in cold weather, and that is precisely what has been done with it.

Two ears were sewed up in the legs of stockings; one wrapped in carpet rags; one ear was packed in the downspout of a tin gutter, with instructions to pull on the string to get the ear out. There was a wagonload of tissue paper. Newspapers published from Maryland to Maine were used; corset boxes, fancy glove and lace boxes, shot sacks,

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and sewed up and tied up and nailed up sufficiently to have gone around the world without damage.

Two hundred packages came by express and freight, packed in sawdust, bran, shavings, confetti, and goodness knows what else. One ear was wrapped in the most beautiful red plush. Taking it all together, it was the most secure and best lot of bundles I ever saw go through the United States mails.

One mother from South Carolina wrote: "George and I are mingling our tears together on account of a span of neighbor's mules. George won't be there with his corn." One boy from Indiana wrote: "Mother's confounded geese got my prize ear last night."

A Missouri boy wants to be shown the "galoot who stole his prize ear." Robert Wilson, from away over at Casner, Ill., stayed all night with "grandmother" at Decatur and journeyed to my office next day with some choice ears for himself and friends, and had a great time helping us unpack. He is a clipper, and we enjoyed him lots. Thornton McElvain, of Auburn, Ill., caught the early morning interurban and landed with his corn before breakfast, but had to get back for school. Lots of boys from Macoupin and adjoining counties came on horseback and in buggies to land their corn safely and in order. One boy from Morgan county raced across the country twenty-five miles on horseback to get here "before the polls closed." One boy from Missouri writes that "My corn that I am sending you has cost me lots of tears and sweat and lickings, and father wanted to feed it." Another boy, from Kentucky, says: "This ear may cause a separation before I get done with it, because my girl and I don't see alike. She wanted me to take the postage money and go to the picture show."

One big, red-faced farmer from my own county remarked that this contest "afforded Otwell a great chance to get a lot of fine seed corn free from the boys." But that point was covered at the time these rules were made. I told the boys that every ear of their corn, after the judge had awarded the prizes, would be donated to some orphan boys' home, absolutely free of charge, and that has been done.

It seems almost too bad that this beautiful seed should not find its way into the soil again, but think of the dandy fine breakfasts for a half hundred fine orphan boys this beautiful yellow corn will make. There is n't a boy in our entire crowd that will begrudge his summer's work or the trouble it cost him to mail me a sample ear, when he knows that the final disposition of his corn is to make some other boy happy.

Dolph Lingle, before he died, asked his father how his prize corn was getting along, and his father shucked a few ears and laid them on his bed, and he culled them over and picked out his choice, and, wrapped in the memory of his summer's work and plans, closed his eyes to awaken amid whiter fields and reap the fruition of a good young life well spent.

Lying on my table is a beautiful ear of yellow corn with a tiny band of black crepe wound around it, and down in the little cemetery at Egan, Ill., sleeps its author, Chas. L. McCartin. Charles was a fine boy, with a high purpose, and he put up the best fight a young man could make, but lost. It's the same great battle that all must

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wage, and it's the same great battle that all must lose. Not every one is equipped with youth and strength and young ambition as his armor. I shall cut off a little piece of the crepe and wear it on the lapel of my coat in memory of Charles, and his ear of corn I shall keep, and when spring returns and it is warm and bright I shall plant it in the earth to grow again, and when it blooms and bears fruit I will remember the good young life that went out so early.

Wm. A. Carlson sent his prize ear, and wrote with his left hand, and thinks he may lose the other one on account of blood poisoning. It has been lanced sixteen times, and is still very bad.

In one township our boys took sixteen premiums at the local corn shows, and then sent their prize ears to the greatest of all boy contests.

Up to this time I do not know of a single boy who has fudged on the rules. If they have practiced deceit on me or have played false anywhere down the line I do not know it, and hope I never may. I would rather a boy would fool me once in a while than to go around suspicious of all boys all the time.

I believe the fathers and mothers see in this work exactly what I see. It is n't the corn the boy raises, it is n't the prize that he gets, it is n't the one supreme moment that counts for the most. I attended a "field day" in an adjoining county and watched Mr. George come down the home stretch in fine style. He ran with head erect and chest extended, and was carried off the field by the noisy boys, who could eat him up. When the race was won every boy in that neighborhood tried to run like George did. They held their heads up and took the long strides that George did. But their wind went short at the quarterstretch, and they fancied that George must have some secret, and so they implored him to become their teacher. He started them in a walk. He told them they must walk well before they could run well. Half the boys quit and declared it was no fun to walk. He had the others to run slowly for a month to toughen up their muscles and expand their lungs. Two-thirds fell out of the race, and when the final showdown came George had but one pupil who stuck through thick and thin and carried off the medal.

There was a trick bicycle rider who came to Carlinville week before last, and Mary and I watched him go through more antics than I ever supposed could be performed on a bicycle. He rode two wheels and three wheels and one wheel, up side down and down side up. He crawled through his machine forward and backwards and sideways, and within four hours after he left town every boy in town was trying to be a trick rider.

I was over in eastern Illinois at a boys' meeting one night not long ago, and it was an occasion that would put life into a wooden man. Seated upon the platform with me, besides the singers, were two hundred boys, old and young, and that would inspire any man to do his best. The boy spirit rolled up and down that opera house until you could feel it like an electric battery. When the meeting was over, so the chairman said, one thousand four hundred people came by and shook hands with me, and among the number was a very stylishly dressed middle-aged woman. She wore a big green hat with three ostrich plumes large enough to shut off the view of three small boys, and a silk gown that I would roughly estimate cost one dollar and seventy-five cents per yard. She was quite striking, and I noticed that when she had shaken hands with me she stepped to one side and waited until most of the folks had gone.

Finally returning to the platform and extending her hand again, she said: "Mr. Otwell, I have been perfectly enraptured with your boy story, and it has led me to see what a dwarfed life I am living. I make no boasts of it, but am considered quite well to do and have absolutely no one depending on me. I am wondering to-night if you can't point out a great work that I might do for the boys of this country, and if you will I promise to be about it."

"Yes," said I, pointing to a little ragged boy of about thirteen; "there is the son of the janitor of this opera house. He is n't warm, and, I am told, can not attend school regularly on account of clothes and books. Be a good friend to this boy, and when he is comfortable and in school look out for some other boys, and soon your horizon will broaden into that great work you speak about." She looked at me, half in pity and half in disgust, and then asked me if I thought her talents were limited to one boy.

"No, indeed," I replied, "but this is the nearest boy who needs help, and I am sure he would appreciate it very much. When his needs are supplied others will come, and so on; your work will expand into the great work you so long for." As she said good night she remarked that she did n't believe she "could stand to work among poor, ignorant boys, anyway."

No, sir, George did n't learn to run in a single afternoon. He first learned to walk, and then run slowly, and then he practiced running more slowly up hill on his way to school to toughen the muscles of his legs. Finally he increased his speed, and after months and months of training he hit off a clip that brought forth the cheers from the grand stand, and against his wishes his friends pinned a blue ribbon on him.

Yes, siree, a crowd of farmer boys that can get the seed and prepare the ground and plant and cultivate and enrich and water, and gather and pack and send in a single ear to reflect their summer's work, are laying a foundation of the right sort of cement on which to erect the structures of their lives.

You fathers and mothers know that I don't put in my time preaching impracticable things to your boys. I never have wanted them to become little Sissy Willies and sit around in Sunday school with their arms folded all the time and never speak above a whisper. I want them to breath deep and make a lot of red blood in their veins, and hold their heads up and be somebody.

Yes, sir, I have told our crowd all along that there is nothing in the Sunday baseball business, and there is nothing in the old, greasy, spotted card business, and there is nothing in the mean, low-down cigarette business that a decent boy should want to follow.

I am willing to go out here on the prairies of this country and round up forty thousand farmer boys, and set a gunnysack containing one

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bushel of fine corn by the side of each of them, illustrating the concentrated efforts of their summer's work, and pile up all the cussin and swearin' and old spotted cards and cigarettes and all the mean, strong, rosewood pipes from Maine to Maryland, and let you take your choice.

EFFICIENCY THE KEYNOTE IN THE EDUCATION OF OUR GIRLS.

By MRS. MARY PIERCE VAN ZILE, State Agricultural College, Manhattan, at the Board's fortieth annual meeting.

In introducing my subject, "Efficiency the keynote in the education of our girls," I wish to briefly call attention to the changes that have taken place in the activities and positions of woman during the past century. These changes have been so striking as to arouse widespread interest and discussion. A study of them suggests that the near future will bring other changes equally important, and unless the twentieth century woman is trained to meet them the American home can not attain to the degree of comfort and prosperity which rightly belongs to it.

The change in woman's interests which is most striking is that due to changed industrial conditions. The time was when all things were centered in the home. It produced what it consumed and consumed what it produced; but the removal of many of the household industries from the home to the factory has gone on until the home is no longer the center of production. Women may be indifferent to the changes that the industrial revolutions have brought but they have not been unaffected by them. The interdependence of all forms of industry is so complete that a change can not revolutionize one without revolutionizing all. The old industrial régime can not be restored if we would, nor can the household employments of to-day be what they were a hundred years ago. Housekeeping no longer means washing dishes, scrubbing floors, and making soap and candles; it means the directing of how products of other people's labor shall be consumed; it means the spending of a given amount of money for a great variety of ready prepared articles and so using them as to give the greatest satisfaction and best mental, moral, and physical results. Women must take their place as organizers and superintendents of the economic consumption of the wealth of our land, for when the home ceased to be a manufacturing center it became the center of consumption. It is estimated that the consumption of ninety-five per cent of the world's goods is controlled by women. This is a new and serious responsibility and requires a training quite different from that of the woman who distributed among the members of her family the products of their united labor.

Because so many of the American homes of to-day are centralized in certain districts a second new responsibility has come to woman, that of intelligently and effectively coöperating with other members of the community for the welfare of the individual households. The home does not stop at the door—it is as wide as the world into which the individual steps forth. To safeguard the character and preserve the interests of those of her own household woman must exercise a control over the

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streets, the schools, the street car, shops, parks, libraries, galleries, places of amusement, etc. To woman the vices of the streets, the civic questions relative to schools, libraries, etc., are vital questions, to be interpreted in the light of the effect on the happiness and safety of her family.

It is recognized that as a result of woman's activity there has been a decided uplift in urban life. She no longer thinks of her household as an independent organization, but recognizes that the conditions which she wishes for her family must be, in part at least, determined by the community as a whole; consequently she leads in any effort which will bring improvement. Improved sanitary environment, free public libraries, and playgrounds, well-equipped hospitals, and organized juvenile courts are evidence of her efforts.

Another potent factor to be considered in discussion of woman's needs is the change in her social life and its consequent results. The old-time hospitality which brought together whole families for the entire day has gradually given way to a perfunctory recognition of social obligation which finds expression in new methods of entertaining. The elaborateness of these affairs so frequently necessitates the use of public halls, of caterers, of florists, etc., that the real meaning of hospitality is lost. As a result the more serious-minded woman has come to seek satisfaction for her social interests in the club and similar organizations. This has necessitated the development of the power of coöperation, a faculty frequently deplorably absent in the individualistic life of woman under the old order of things. These industrial, civic, and social changes have greatly modified home life, and many are pessimistic enough to believe that the American home is losing its hold on its individual members because of them. To avoid this the home must be lifted and put upon the level with other features of progressive civilization. The girls must receive a training to meet these new duties and responsibilities commensurate with their importance. They must be given a new conception of the duties and privileges of the home maker; they must be taught to look beyond the mere doing of things to the end to be attained—the health and happiness of those in their care. To give this training it is necessary to develop an educational system under which each girl may be trained so as to be effective individually, and fit to be organized with her fellows so that she and they can work in efficient fashion together.

To-day as never before is evidenced the universal desire for education. Men from all classes have come to look upon education as a thing which will better their condition by making their labor more effective. They do not expect education to relieve them from labor, but to relieve them from the drudgery that is the result of ignorance by teaching the more economic and intelligent use of human effort. As a result of this changed viewpoint the educational standards for woman have been broadened. Less than two centuries ago forty per cent of the women could neither read nor write. Girls were not admitted to public schools previous to 1760. The first public high school for girls was opened in Boston in 1852. Collegiate education for women had its beginning in Oberlin College in 1833. These privileges were not granted women without much opposition. Loss of womanly grace and charm, lack of brain material necessary for in-

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tellectual development and physical unfitness were some of the arguments offered in opposition, but in spite of all opposition the movement has grown until the educational standards for women in the United States have come to be recognized with admiration the world over.

Mrs. Talbott tells a story to illustrate the extent to which women have availed themselves of their opportunities. A little boy six years old had five sisters older than he. Two were fitting for college, two were in college, and one had just graduated. A friend said, "Albert are you going to college when you are older?" The little fellow stood up very straight and with a good deal of dignity said, "No, I'm going to be a man."

Woman has gained the position she now holds by proving beyond possible doubt her fitness to attain the highest intellectual standard, and to enter every realm of knowledge. She, however, is not satisfied with the development of her intellectual powers. She believes that any perfected educational system must give every girl the chance to make the most of her individual powers in every line. She is urging that it is the heritage of every girl to be developed most completely and perfectly. To do this, attention must be given to her intellectual development, but at the same time her physical, æsthetic, social, domestic, economic, and spiritual development must not be overlooked. The training must be one process, unifying all the powers of the individual rather than developing certain ones at the expense of others. The evidence goes to show that there is a marked tendency for our public schools and colleges to adjust themselves to meet these educational requirements of the girl, but there is much yet to be done. Our girls are looking to the schools to fit them for the duties of life. To this end educators must construct the educational policies so that the schools will be a true picture of life in all its essential activities. Vocational studies must be introduced into our schools. Home training has claims upon educators, as have literature and music—perhaps no more, for both contribute to freer and fuller development of human life. What is said of home training, music and literature may also be said of every other subject that will develop individual capacity, and education may if it will enrich them all.

In our schools and among our teachers there has been and to some extent still is a tendency to overrate intellectual development as compared with physical training and the formation of character. The philosophy which long ruled our educational policy has been so modified by research in the sciences and by development of the industries, arts and professions that it is now recognized that a perfected educational system must include vocational training. The great mass of human happiness will always arise out of doing well the common things of life, and the happiness of the individual will be in that creative genius which does to-day the same things it did yesterday but does them better. There is no higher duty than to unite education and activity, to see to it that no individual shall be compelled to choose between an education without a vocation and a vocation without an education. Required English, history, science and psychology assume a new significance when they are recognized as essential tools in the accomplishment of some definite purpose. Vocational education can not be considered by itself alone any more than an industrial people can live alone. It must become a part of a general

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scheme of education that has for its aim higher efficiency of all classes of people. The colleges and universities are acting on this policy. The curriculum, once confined to classical learning, has broadened so as to cover the practical as well as the theoretical. These broader plans have been largely thrust upon the schoolmen and recognition has been forced, but the result is noted in the success attained by combining industrial, technical, and scientific studies with the general studies. The result is evidenced in new courses of study for our boys and girls. At first the mechanic arts were brought to a pedagogic basis; then agriculture, slowly but surely, was brought to a teachable form; and at last home economics has been brought into the schools. It is safe to assume that there are now but few educators who are so conservative as not to be in sympathy with collegiate education in engineering; most of them have come to believe that agriculture has been reduced to a teachable form; but many still have little faith in the possibility of successfully teaching domestic subjects.

Grant that the system of education in home economics is only in its formative stage; that the lines and methods of work have only been roughly blocked out; that there needs to be much study and much effort to perfect the system and to give it high pedagogical value; we still have the right to urge attention to its merits, for among the questions that are engaging our thought and attention to-day, certainly none is more important than that which centers about the problems of our home. The home is the center of the universe and the mistress is the center of the home. In her hands are the keys of home happiness. She is the disbursing end of the marriage partnership, and on the wisdom of spending depends the financial prosperity of the family; on the efficient home management depends the comfort and happiness of the family; on the proper care and guidance by the mother depends in a large measure the character and life success of the children; in the selection of the food and its preparation, together with the sanitary character and care of the house, depends largely the health of the family; on prompt action in emergencies, on the immediate recognition of disease, and on proper care during convalescence oftentimes depends the saving of life itself.

If progress is to be made in the household, it must be no longer assumed that a home can be well managed by a woman whose reasoning powers have never been cultivated, who has never been taught self-reliance and self-control, who has no conception of accuracy, who has never acquired the habit of observation, and whose inventive genius and fertility of resource are expended in providing for the pleasures of the day. It should, however, be an accepted fact that being born a woman is not being born a home maker, and that she needs the wisest training we can give her to fit her for the most responsible position she can ever hold, that of wife and mother. It has too long been assumed that the housekeeper is born with an intuitive knowledge of the machinery of the home. Every manufacturer or business man knows the value of his industry, its increasing or decreasing value, the cost of materials used and of service employed. This information is a part of the capital with which he begins business; he does not acquire it by instinct or tradition, but by careful and exact study of all factors involved. It is

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equally true that a household can not be successfully carried on except through application of the same principles.

The training of a girl should prepare her to meet at any moment any emergency that may arise within her home. There are demands made upon the home maker every hour which call for exercise of reason, judgment, self-control, alertness, observation, accuracy, ingenuity and inventive genius. Where shall she get this training if not in school? The need for this training must be accepted not alone by colleges and universities, but by secondary schools as well. There is too strong a tendency for the high school to become a college preparatory school—to be conducted solely in the interests of those who graduate, with but little reference to the much larger numbers who take but a part of a course. Dean Davenport says:

"The greatest trouble with our educational system to-day is that it is laid out too much on the plan of a trunk line railroad without side switches or way stations, but with splendid terminal facilities, so that we send the educational trains thundering over the country, quite oblivious of the population except to take on passengers, and these we take on much as the fast train takes mail bags from the hook. We do our utmost to keep them aboard to the end, and we work so exclusively for this purpose that those who leave us are fitted for no special calling, drop out for no special purpose, but roll off like chunks of coal by the wayside—largely a matter of luck what may become of them. I would reconstruct the policy of this system by making all trains local, both to take on and leave off passengers; and I would pay much attention to the sideways, and the depots and their surroundings, and the way stations, to the end that those who do not complete the journey may find congenial surroundings and useful employment in some calling along the line."

This may be an exaggerated viewpoint, but unless educators recognize the demand for vocational training the next few years will see the decline of the present high school and vocational or trade schools will take their place. To avoid this, which in my judgment would be a step backward in the development of our educational system, vocational work must be made a part of every high-school course, combining the vocational and liberal studies in such a way as to train its students not only industrially but for all duties of life. There are great times ahead of us if we are wise. The people of Kansas believe in education and are willing to give freely of their money if the education of their young can be made useful; if, too, industry, knowledge, culture and refinement are added.

In constructing the educational policy for our youth we must not lose sight of the real problem of education. It has been said that it is to fit a generation of young people to live a life not like that of Babylon or Egypt, nor yet of Greece or Rome; not like that of western Europe, nor like our America to-day; but a life such as is likely to be theirs twenty or thirty or forty years hence. They should be taught the world's past, for they will need that knowledge for guidance in meeting new and difficult issues, but they should certainly be instructed in the present, and in all methods which tend to develop independent initiative, so they may become self-supporting members of society, with ability to adapt themselves to conditions as they find them.

I plead then for this general training for our girls, not alone for the benefit of this generation, but for generations unborn. Let us bring to bear upon this subject all the intellectual strength and all the genius at our command. Out of this movement will then come the uplifting of the home ideal, the rearing of finer and stronger men and women into freer and fuller lives of usefulness and happiness.

WHILE SHE WAITS.

By Miss EDNA B. DAY, Department of Home Economics, State University, Lawrence, at the Board's fortieth annual meeting.

I was born in New York, brought up in New Jersey, and have either studied or taught in Michigan, in Ohio, in Illinois, and in Missouri, and now have come to Kansas and am telling all my friends that I find it the best state I have been in yet. It is the most progressive, the most civilized. You do things the others talk of doing; you have prohibition; you have reformed court procedure in the interest of justice rather than of technicalities of law, and you have abolished the common public drinking cup. I went out of the state at Christmas time, and I felt that I was going to a lower state of civilization when I found myself again with the public drinking cup. And it was with great pleasure that I returned from a week of rain in St. Louis to "sunny Kansas."

There has been much talk these last few years about the conservation of our natural resources; coal, gas, lumber, soil fertility, all have been the subject of serious consideration. Not stopping here, reformers have succeeded in proving that child labor is a waste of natural resources, robbing, as it generally does, the future citizen of health and education.

There is yet another form of waste that needs to be considered, and remedies sought. It is of this I wish to speak to-day. The waste of time and opportunity by the average girl while she waits. Every year as young women and anxious parents come to me for advice, I am led to a fuller appreciation of the situation. Since many of you, also, have the responsibility of giving advice to young women, perhaps you will be interested in my analysis of the problem, and my suggestion of a remedy. May I begin by reading a quotation from Olive Schreiner's "Dreams"?

"All day where the sunshine played on the seashore, Life sat.

"All day the soft wind played with her hair, and the young, young face looked out across the water. She was waiting—she was waiting, but she could not tell for what.

"All day the waves ran up and up on the sand, and ran back again, and the pink shells rolled: Life sat waiting; all day with the sunlight in her eyes she sat there, till, grown weary, she laid her head upon her knee and fell asleep, waiting still.

"Then a keel grated on the sand, and then a step was on the shore; Life awoke and heard it. A hand was laid upon her, and a great shudder passed through her. She looked up and saw over her the strange wide eyes of Love, and Life now knew for whom she had sat there waiting."

"All day Life sat waiting!" Were it only a day, or a year, or even a few years, it would not make so much difference; but when, as often happens these days, Life must wait five, ten, or even fifteen or twenty years, the problem of what to do while she waits becomes a serious one. Twenty, fifteen, ten, five, or even one of the best years of Life is too much to spend sitting idly on the shore watching the waves and pink shells. Yes, of course, but Life, as she sits there, does n't know that it will be that long. It may not be for her. That is where the difficulty lies—in the uncertainty. Her Prince may come to-day, he may not come for twenty years, he may not come at all!

Probably the majority of our grandmothers were married at an earlier age than our high-school girls graduate to-day. And our mothers did n't have to wait much longer. But it takes so much time these days for a man to get ready to earn a living and it costs so much money to keep a home that it is no wonder that the girls are kept waiting long while the man gets the necessary education, money and courage.

And you men have been so busy trying to solve your own problems of how to get the necessary money that you fail to realize that the changes have brought new problems to the young women also, and that they need your sympathetic help in trying to solve them.

I was much interested at home this summer at the coming to consciousness of this problem by one of our neighbors, a physician. He had always expressed strongly the belief that the home was the woman's sphere, and had naively taken it for granted that it is always a woman's own fault if she does n't enter it at once. Two years ago his only daughter graduated from high school. He had always said that she was not to go to college, but he compromised by sending her away from home to another college preparatory school. Then he kept her home a year, with a coming-out party to indicate that she was waiting. Incidentally she took private lessons in French and music, and was supposed to learn housekeeping. But the family keeps two maids and the mother is in full, vigorous health, so Margaret's housekeeping was a farce. There was not enough of an incentive for her to do it seriously.

Her brothers, three and six years older, have had four years at college and two or three years professional education beyond, and are now on the lowest rounds of the professional ladder, the one a physician serving a hard apprenticeship as hospital interne, earning only his board and keep; the engineer in overalls doing little more than day laborer's work, but cheerfully, for he knows that it is but for a season. The father, knowing that his boys are not ready to marry, is beginning to realize that it will probably be some years yet before Margaret's Prince is ready for her. But what shall he do with her in the meantime?

Among his patients are several young women in bad nervous condition, only because they have nothing to think of but themselves and their feelings and symptoms. What to do with them he does n't know. All they need is to be given some object in life, but how? He can't supply the Prince (not that he even mentioned that). Their help is not needed at home and it is contrary to the ideas of their family that they should work. He could not allow his own daughter to get in the same condition.

I suggested that Margaret be sent to a near-by school of domestic science, and that she take the teachers' course. Then, if need be, she could be self-supporting, and in the meantime she would be getting the training she could n't get at home.

If the father had not been so outspoken against college education for women, the problem might have been postponed by sending her there for four years. It used to be that only girls with strong scholarly bent went to college; but now the number is rapidly increasing of those sent there by parents who don't know what else to do with them while their natural mates are preparing to support them. And because the college course has not been planned for such as they, they play with the college curriculum as idly as the girl in the dream with the sand and shells at her feet, waiting, just waiting, a serious problem to the instructors.

Do you not wonder that every college does not more quickly awaken to the situation and give the girls the work that will help to fit them for the kind of life that most of them hope to live? Here is another place where Kansas shows her progressive spirit; not only was her Agricultural College one of the very first to give instruction in domestic science, but her State Normal School has recently developed a large department of the same, and now at last the eight hundred girls attending the State University, who need the work as much as any, have the beginning of an opportunity in this direction.

If there is less money, the problem of what to do while she waits is generally more easily settled. The girl and her family more quickly realize that she must work. However, it is generally tacitly understood that it will not be for long, and it hardly seems worth while to spend much money getting ready to work when—well, "when she may not care to do that kind of work long." She may not care to, but Princes hesitate these days, and many a girl finds herself in middle life doing work she does n't like, for which she is poorly prepared, and with the prospect of continuing it the rest of her life.

This condition is bad enough, but it is not as bad as that of many another girl whose Prince came early but found her unprepared for her life work. Housework as well as any other work for which one is unprepared is hard drudgery. But so accustomed are we to the myth that women instinctively know how to keep house that we often fail to realize that lack of preparation may be the cause of the trouble when the work seems unduly hard. We forget that through all the ages until very recently every girl prepared for marriage by a thorough apprenticeship at home. The girls of a few generations ago, having no schools to attend, had time not only to gain housewifely skill, but by the time they were sixteen or seventeen had commonly stored away in their cedar chests a store of house-linens that would last more than a lifetime. Since the factories have taken from the homes very much of the old housework, spinning, weaving, soap-making, etc., girls have been free to go to school, free to play or to work outside of the home, to the neglect of the old apprenticeship, and we are only slowly coming to realize that it was something more than instinct that made our grandmothers good housekeepers.

In the early days, women were not alone in preparing for life work by the apprenticeship method. Even doctors and lawyers often got their

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training by working in an office, instead of by going to school. And training-schools for business, for engineering, for farming, were unknown. I recently heard President Waters give statistics showing that it pays financially for a man to take the money and years for long expensive training to be an engineer; and he believes, and you believe, that had we the statistics they would prove that an agricultural course pays also. And the farmers of progressive Kansas have long recognized that it pays for young women to take professional training for their work in the profession of home-making. But in most places the standard for woman's work in home-making has decreased instead of increased. Even the old apprenticeship is discarded as unnecessary.

Of course, many girls still get a practical training at home, but it is not often as thorough as that of the olden days. The girls must do too many other things in addition, and conditions are changing so rapidly that the apprenticeship system is not as effective as it used to be. Grandmother's rules, the embodiment of family traditional experience reaching back through generations, do not always work these days. And rules of to-day, unless they get back to most fundamental principles, may not work a few years hence. You know in your own work that what used to be economy before the days of cheap factory products and convenient transportation is not economy to-day. So in the home, many conditions are different.

The work of the home-maker to-day is more that of a money-spender than that of a producer, as of old. Of course, it takes no training to empty a pocketbook. But within normal limits, it makes nearly as much difference how it is emptied as how much is put into it in the first place, and as much training is needed as preparation for wise spending as for successful earning. The products on the market are constantly changing, and it requires a good knowledge of general principles to know enough to even read intelligently pure-food labels.

Certainly, a girl ought to spend time in getting ready for home-making! But suppose she does; suppose she even takes three or four years in a college course of home economics, what then? She can not hang out a shingle and announce to the world that, having her diploma, she is ready for the Prince. No, she may have to wait a number of years longer. What shall she do? For her own health of mind, if nothing else, she would better be working. For, seeing this situation, advisers wonder, "Should she be prepared for home life or to earn a living?" some say, "Let her prepare for the money-making first, and after engagement or even after marriage take a few courses in domestic science." (This by those who don't know how much there is to be learned.) Since she may never have a home to keep, why prepare to keep it? Moreover, the girl is not supposed to know she is waiting. In fact, it is the fashion in some quarters to ignore the possibilities of the Prince's coming and to make ambitious plans for a career without him.

Not that the makers of these plans are not generally willing to give them up if the right Prince comes; but they are able to choose more independently and so run less risk of making a serious mistake if there is

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something else that may fill their lives if they don't marry. And no woman is quite free who can not fall back upon such an alternative.

Moreover, earning money before one marries often helps to make a more sympathetic wife and a more intelligent mother. And it not only gives a woman freedom in choosing a husband, but if she can manage to maintain her skill in her profession during marriage, it forms the best kind of an accident insurance policy. According to statistics, in colonial and pioneer days it was quite common for men to have second, third and even fourth wives, the strain of hard work killing off the wives more rapidly than the husbands. In these days, the strain of increasing standards of living and excessive competition in business kills the husbands more rapidly. It is said at present that one out of every five women who have been married, is without a husband, a host of widows needing some means of support.

Yes, it is very important that women know how to make money outside of the home. But there is one precaution that should be given to every girl who earns money while she waits. Be careful not to establish such a high standard of living that you postpone the time when the Prince dare to come, or, perchance, that you keep him away entirely, because he can not keep you according to the standard you have established. Don't spend all your money, much as you feel the need of all the things it will buy. Save a large proportion for your contribution to the home-making, and thus hasten the time when you may begin. You have not spun and woven household linens that will last a generation, and it is only fair that you should contribute of the fruits of your modern labors. Yes, if she can work and save money, she can lessen the time of waiting. The question is, how to be prepared both to earn money and to make a home. To live without the Prince or with him, according to circumstances. I recommend a study of home economics as a preparation for both.

At present, the demand for teachers of this subject, especially experienced and well-trained teachers, is greater than the supply, and the demand is increasing so rapidly that it will continue ahead of the supply for some time. Besides this, there is the demand for trained women to be matrons and housekeepers, or housemothers in colleges, dormitories and institutions of all kinds. Hospitals are asking for trained dietitians. There is a call for caterers, artistic dressmakers, milliners and house decorators. We need women with brains, conscience, and business ability to run laundries.

"But," perhaps you say, "a girl could n't do these things and live at home on a farm, and we want our daughters at home. We quite agree that she should have this domestic science training, but then let her come home and help her mother for a while."

Certainly, if her mother needs her help.

"But," some of you may say, "her mother does n't actually need her help, but we want her company after these years of separation, and you would urge her to leave home and earn money when we have enough to keep her." But is she happy just to stay at home to be company? Would you be happy so? (I have heard many girls tell of their difficulties in being content with this kind of a life.)

Every one needs a work in life to be happy, young women as well as young men, and no one is good company who is unhappy. However, the leaving home is not always necessary, by any means. By just a little work supplementary to her domestic science course, a girl can learn the principles of scientific poultry raising, scientific buttermaking, or of home canning for the market. There are fancy prices for first-class products of these kinds, enough to tempt any ambitious girl. And if your daughter learns to do some such work as this in addition to her domestic science training, you can keep her happily at home, keeping up her practice in domestic science by giving her mother such help as she needs and in addition, with her own special work and earning her own special income, while she waits the opportunity to have charge of a home of her own. And if that opportunity keeps her in the country she will find times when she can continue her supplementary work sufficiently to keep up this practice so that in case of need she may again do it professionally.

But some others of you may object, saying, "Suppose a young woman has another talent than you suggest. Is it not to be cultivated?"

By all means. Even the most devoted home-makers must have broad human interests, else how can they be sympathetic wives and mothers? Moreover, every talent cultivated means a home that much richer. And a talent deserves cultivation for its own sake. Society as a whole demands the best that is in every woman as well as in every man. But, being a woman, her talent even may not keep her from following the Prince when he comes to claim her. So, if she loves her talent, let her cultivate it, but at the same time, let her study home economics as well so that if she follows her Prince she may be able to make his home expeditiously and still have time and strength for her special gift. Many a girl has spent hours and hours and hours on her music, only to find when married that she has n't time to even dust the piano, let alone play on it.

I have frequently noticed that a father's chief desire in the later education of his daughter is that she should be trained musically; perhaps because his wife has been too busy with home duties to satisfactorily entertain him of evenings, and he would have his daughter so trained, both for himself and her possible husband, forgetting that his wife had to learn home economics in the hard, slow school of experience after marriage and to spend the time that he wishes was free for music on these homely lessons. He should be made to realize that his daughter will have the same trouble if she does n't study home economics as well as music. On the other hand, many a mother's idea of the last of her girl's schooling is that it should be such as not to interfere with her having a good time, "for," as she says, "she will have to settle down all too soon (*i e.* she will if she marries as young as her mother did) to the hard drudgery of life." Such a mother needs to be told that her daughter need not find housekeeping a drudgery if prepared for it professionally, and that by giving up some good times now she may hope to have time and strength for good times all the rest of her life.

Summarizing, then: Due to increasing standards of living and the increased time necessary for a man to become prepared to earn a living, the average age of marriage is getting later and later. While she waits,

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the average girl frequently gets sick and tired of social life, sometimes becoming a nervous invalid if kept with nothing to do. At the ordinary college, the domestically inclined but not scholarly girl often wastes both her own time and that of her instructors. If the waiting girl goes to work, she frequently does it with only a hasty preparation that lowers the standard of woman's work and makes her a discontented worker, and she generally lives up to her income, acquiring such high standards of living that she is not willing to marry a man of her own class who is earning, perhaps, but little more.

Parents and advisers are slow to realize the change in conditions and frequently advise short-sighted remedies. A young woman ought to be encouraged to spend time profitably while she waits; she ought to learn to make money that she may be free to choose her Prince, or to live independently and happily without him, if he should never come; she should be prepared for home-making in its broadest sense, and she ought to be able to carry through her married life enough practice of her chosen profession that she may be able to go back to it in case of need.

It is easiest, in many cases, to prepare for all this at the same time by studying home economics. But on the farm some closely related work, such as poultry raising, may be profitably undertaken; and while special talents in other directions should not be neglected, their cultivation should be accompanied by a study of home economics, if one wishes time to continue their cultivation after marriage.

Whichever way we turn, the conclusion is inevitable that every girl should be taught home economics. And again I congratulate you Kansans that you have had the wisdom to give such large numbers of your daughters the proper opportunities, and I am sure that you will not stop until every school in the state, high and low, city, town and country, gives this needed instruction, and gives it in the best way possible.

THE INDUSTRIAL SCHOOL GIRL—DOES SHE COME FROM THE FARM? SHOULD SHE GO THERE?

By JULIA B. PERRY, Superintendent Girls' Industrial School, Beloit, at the Board's forty-first annual meeting.

The industrial school girl is not a product of the farm. Her life has been one of idleness, so far as useful work is concerned. For this reason, if for no other, farm life would be distasteful to her. Her mind ever active and her brain full of well laid schemes, she yearns for the maddening whirl of excitement found in the evershifting scenes of city life. Generally speaking, the congested portions of our larger towns and cities replenish our industrial school ranks. Too often she comes from the disrupted home, the home where intemperance has done its disastrous work, or, it may be, the home where the modesty of girlhood has not been properly emphasized. Farm life does not appeal to her, for the reason that it bespeaks toil, self-denial, drudgery, too much work and no pleasure. This imaginary picture she has drawn of rural life is not wholly untrue; farmers' sons and daughters give evidence of this. Too often we find them seeking leisure, happiness and employment elsewhere than on the farm, simply on account of too long hours, all work, little time and thought given to home pleasures, and because the home suffers from a lack of modern conveniences.

There are features of life in the city which the country dweller finds full of alluring fascination. "The crowded life, the jostling movement of its hurrying throngs, the constant adjustment and readjustment of life to life, man to man, need to need, make the city a place of endless and absorbing interest."

Man is a social animal and feels keenly the need of such association and social life as the city alone makes possible. The question arises, Is it possible to give our rural life the human interest, the social pleasure, in place of the isolation and loneliness?

Did the farmer of to-day give much thought to the needful conveniences in the home; did he plan to provide for the enjoyment of his sons and daughters as he plans to have his stock protected, his granaries filled with ripened grain, his alfalfa well stacked, he would find his returns in stock and alfalfa greater, the home life happier, fuller, and better, because of new energies expended by the ones in the home. His boys and girls would make the most of advantages offered; the farm life would be enlarged and mean more to them than all the inducements that city life can offer.

To teach the industrial-school girl, who has never known toil, that there is pleasure in work, to correct perverted tastes and ideas, to induce her to believe that our every thought is for her future success and happiness, is the problem that confronts the one who has her in training. Notwithstanding, however, that her life has been an aimless one, we must not think of her as indolent or lazy; indeed, it is a rare thing that a girl of this kind comes to us.

Generally speaking, our girls have been too big for the places they have filled and too shrewd for the ones who have dealt with them. Studying them, we find them almost universally energetic and painstaking. Working or studying, they are not satisfied merely to drift, but strive to excel. Our first effort is to turn their ever-active minds, their strong wills and determined spirits into channels of right doing and right thinking. It is no unusual occurrence to see the girl who has been unmoved by a mother's entreaties or a father's rebukes turn face about, using all her powers of mind, body and soul to become a new creature.

The work habit once formed, one is continually surprised to know how much pleasure is put into any task that is assigned them. To think of the marvelous change in the girl's likes and dislikes—that now she loves to do the things she once hated, whether it is sowing the seed, cultivating the plant or gathering in the fruits of her labor—makes the study of the girl a real delight.

It is impossible for all who are interested in the work of saving the delinquent girl to study her from the standpoint of actual experience, but if you will follow me in an imaginary journey to Beloit, where our Girls' Industrial School is located, it will be my pleasure to explain as nearly as I can the nature of the work done and the results accomplished. As we study different phases of the work, you will keep in mind that the aim of our school is the correcting and remodeling of character. It is your right to know what the influence of the school training on the ones trained is, and whether success in character-building is really obtained.

Our first approach presents to our view well-planned grounds, massive stone buildings, erected at great cost to the state—all beautiful to look at. The interior impresses one with the amosphere of a home. Busy life is on every hand; little girls with sweet faces trip through the halls on errands here and there; distant strains of music are heard, or snatches of conversation reach the ears.

Two hundred and fourteen girls in number are assigned to the different buildings, on the basis of their school classification, and are under the care of their respective school-teachers. Each girl is a study in herself, and goes to the place best adapted to her disposition and needs. Everywhere the hum of business prevails, no one building being set apart for department or industrial work. Education here means more than just an education of the mind. The eye and hand are trained by means of basket making, rug weaving and bead work, as well as the education more pronouncedly belonging to the kindergarten. Special attention is given to artistic training, which here reaches its most exquisite development in water-color and china painting.

The educational work of the school embraces grades from the primary to a complete course in high school. The fact that many of the girls go out to enter the high schools of the state, without demotion, is an evidence of the thoroughness of the work done. Many of the paroled girls pursue their school work after leaving the school, and compare favorably with young women having better advantages in the start.

As an educational factor, we find a well-selected library of books suited to the needs of the school. Strange as it may seem, the proportion of even strong, wholesome fiction seems small as compared with the number of books that impart desirable information in an attractive form. On close examination it may be observed that a book can not be found in this library that could be injurious, nor do we find that violation of good literature known in common parlance as the Sunday-school book.

We will now view the rooms specially set apart for the accommodation of students. We find them bright, clean and pleasant, as sanitary as a hospital and far more attractive. In the large dormitories there is a semblance of home life. Here the older girls exercise a watchful care over the little ones, while the monitor herself is developed by the responsibility imposed upon her. Here in the evenings the children—for such they really are—sit by the beds assigned them, reading their books, dressing their dolls, sorting their treasures, employed with needlework, or softly playing such musical instruments as they possess. An interesting book is sometimes read aloud for the benefit of those engaged in needlework or doll dressing, or a program is sometimes arranged by the monitor.

The spirit that pervades the institution may be explained in this way—*the girls are never idle.* Besides their school work, they are all employed in the various departments at least half the day. Perhaps the one of these most interesting to the visitor is the domestic science department. Here the girls are given such a course as may be found in any woman's college having this training in its curriculum. In a cheerful

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classroom the girls are taught the chemical composition and hygienic use of food stuffs, the foundation principles of bread making and eatable cookery, how to set a table and serve a meal, the proper management of a home, the duties of mistress and maid, the etiquette of entertaining, the neatest way to darn, how to miter corners, and a thousand other things. Their instruction is by no means confined to theory. In a neat workroom are their beautiful kitchen-work cabinets, with their scoured tops and neatly kept compartments. In the pantry are cooking utensils, shining beautifully clean and sweet. Here the girls have practice in actual home keeping according to the best and most sanitary methods.

In the laundry, the sewing room, the bakery, and the various kitchens of the institution the girls receive instruction, while gaining experience through conducting the actual work of the school. No girl can go through this school without learning to wash and iron and make her own clothes, bake good bread and prepare wholesome food.

In addition to the instruction given in the use of the needle in the domestic science department and the sewing room, a special art department is maintained for such girls as have ability or taste for this work. But it is not to be considered a merely ornamental accomplishment. In this day, when beautiful hand work is popular and commands a high price, the skilled needlewoman is assured a comfortable livelihood. We learn, as we make a special study of the delinquent girl, that musical training is one of the best means of developing the will power. The painstaking drill and self-determined discipline required go far toward forming habits of self-control and the resistance of mere inclination. In no department of the school is the discipline more exacting, the drill more thorough than here. The music of the school is under the direction of a skilled supervisor. An excellent orchestra is maintained, and the girls are capable of furnishing a most pleasing entertainment.

Thirty-two girls are found in the stenographic department, all of whom are deeply interested in their work. This department has grown to be an educational force in the institution. Not only principles of typewriting and shorthand are taught, but business principles as well, all of which broaden the girl's conception and prepare her for usefulness in the work of life.

Every one is interested to know what methods of punishment are employed in our institution. Corporal punishment is forbidden. The credit or merit system is in use, and a girl may shorten her period of detention, or stay the full time, according as her conduct shows her fit or unfit to leave the institution for the larger life outside.

The training given is positive in character, working to a great extent on the principle of the elimination of evil through the substitution of good, rather than by arbitrary rule.

Personal intimacy between the girls is overcome by keeping them busily employed at work, in reading, or some other attractive line of activity. The real reforming power lies not in any one thing as the method of correction or religious influence, but in the organization of the whole. The various departments serve as so many tools toward the accomplishment of the salvation of the girl. It is the institution as a whole that

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does the work, directed and organized in such a manner as to impress the girls themselves that they are a part of the management. Every department has its excuse for being, either for the creation of strong character or enabling the girls to become self-supporting, the whole institution at all times being in constant communication with its head. The head of every department is incited to the top notch of endeavor, every one doing her best or else dropping out of the race.

Now that we have taken, as it were, a panoramic view of the school, some of the scenes have been quickly shifted, and the whole may appear to you as a great machine with machine methods; but as we remember the happy, contented spirit that prevails everywhere, as we view the changed life, as we call before our mind's eye the students that are making good, as we again look at the reunited family in the home, the girl giving a new impulse to home life, we are encouraged to believe that our efforts are worth while.

Lest, after all, you have a wrong conception of the industrial school girl, I will say that it is the universal experience of heads of institutions that have adopted modern ideas and modern methods of reform that the average girl who gets into trouble is rarely ever morally depraved.

Mrs. Anna W. Allen, a member of the board of managers of the New York Training School for Girls, said: "Nine-tenths of the girls committed to the New York Training School and similar schools are untouched emotionally and mentally. We must not think her case a hopeless one, her immorality permanent, but teach her to forget the past; give her a chance she has never had—a chance to be good. She may be *socially intolerable but morally quite forgivable.*"

It is the belief of our most successful workers with delinquent girls that their delinquency can be cured. What they need is development, enlightenment and direction, and, above all, be taught to leave the past absolutely behind them. A careful study of delinquency has taught the conscientious worker conclusively that no one is permanently happy whose life is out of harmony with right.

"The condition of the delinquent girl is that of one morally sick; she does not need punishment, but needs to be made over. We do not think of industrial schools as hospitals, but if delinquency is ever cured it will require more thought, more skill and more wisdom on the part of the one who trains the individual than the skilled physician expends on his patient."

"The delinquent girl is to-day a problem that is baffling most of the juvenile courts." "All they know about her is that she is a greater menace to society than they ever imagined, and that the old theories of reforming her are wrong."

"We have ceased to call the delinquent boy a criminal, even though he has done criminal deeds. We must cease to call the delinquent girl a fallen girl, even though she has been guilty of immoral acts. If the thing to do with the boy is to change or alter his environment, to teach him a useful trade; to give him habits of industry, to develop his self-respect, then this is the right course to pursue with the girl."

"There is this difference; the vast majority of girls are arrested for a fault which in a boy's case is not punished. Society has not reached that ethical plane where simple justice is entirely comprehensible. It has not been educated to a point where science is more persuasive than prejudice and conventional sex distinctions. Inevitably there will come a time when it will be known that personal immorality of the masculine half of the world is exactly as much of a social danger as the personal immorality of the feminine half. The results are the same, and the consequences measured in disease, crime, pauperism, illegitimacy and insanity are precisely the same. Until this time comes the juvenile court will struggle in vain with the girl problem."

"The state of the public mind is such that a single misstep, or an immoral act on the part of the girl thrusts her outside the pale of decent society."

"To dispose of an erring girl by ostracizing her is exactly as dangerous as to dispose of typhoid fever germs by throwing them into a public reservoir."

There are times in the life of the one who goes wrong when they would gladly turn aside from wrong if a kindly hand were stretched out to them, if some one were enough interested in them to help them to right ways of thinking and doing. Had it been the lot of such ones to be carefully reared in good homes, where their environments would have been wholesome, their associates well chosen, they perhaps would not be misfits in the social and industrial order of things.

Inherited tendencies also play a part, weakening the individual, too; but since nine-tenths of our race are not as well born as we would like, we must not allow ourselves to think the girl to be unreclaimable simply because her ancestors are lacking in the qualifications that go to make up character of sterling worth.

"Girls, generally speaking, are instinctive respecters of law and order." The careful and intelligent guidance of sons and daughters should be the burning thought of every father and mother.

"O, that our home life might be throbbing with life and plans well laid that would make home the dearest place on earth."

"It is the business of life to be better, and to make things favorable for everybody else to be better."

It is not expected that our girls can do much toward putting our institutions on a self-supporting basis, yet their efforts in ornamental gardening go far toward supplying their tables, and even furnishing a surplus of summer vegetables, which are placed on the market. Seven acres of land are set apart for this purpose, and the work is planned for the good of our girls physically. All work in these gardens, except the plowing, is done by them.

Driveways or ways of entrance are always laid out in the very beginning of the work. To drive or walk through these broad passageways is to find one's self between beautiful borders of blooming flowers laden with sweet perfume. A plot or portion of ground is allotted to each family, and here they have the privilege to design, to model, to ornament according to their own tastes and desires. The work as a whole is very fascinating, besides being one that our girls heartily enjoy and one that

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gives them exercise in the open. They are exceedingly proud of their efforts, and each family vies with the others in making its plot the most beautiful and most productive. Their gardens are admired by all who see them, and many come time and again to view what they have seen many times before.

If this taste of farm or garden life can be made so enjoyable to girls that were never taught to like work, what about our boys and girls that have been taught the beauty of work and the necessity of it to the development of noble character and a happy life? The dairy work, the milking of cows, the butter making, the chicken and turkey raising are all things that appeal to them as they come in touch with these varied industries.

Our farm consists of two hundred acres, forty acres in pasture. We do not have the acreage that we need for this purpose. We have a fine herd of Holstein cows, and this year raised one hundred and fifteen hogs. We have had no sickness whatever among our hogs or cattle. The consequence is, we will have plenty of pork of our own raising and more than lard enough for our own consumption. We also expect to realize a neat sum from the hogs we will place on the market.

Our potato crop, generally speaking, is our largest crop. Owing to lack of moisture the last year, our yield was much less than in the average year. This year we raised over 1800 bushels of Irish potatoes and a large quantity of sweet potatoes. The value of our farm products in the year 1911 to the 30th day of June was nearly $7000.

In all our dealings with our girls at Beloit we try to get as near to nature as possible, and there is no place where we can come in such close touch as in the study and cultivation of the soil. They respond so heartily to our efforts in this direction that we find it a real pleasure to work with them. As we contrast them with the ones on the outside who have had a better start, we see marvelous possibilities for the young, if properly taught.

The ever-mastering thought of the management is to prepare our girls for lives of usefulness and equip them with knowledge necessary to earn an honest livelihood. "It is the safeguard of our agricultural destiny as a nation that not only these girls, but girls everywhere, be trained to the beauty of farm life. Then there will be an inducement for many of them to remain on the farm, to become a farmer's wife and a mother of farmers."

It is an accepted truth that our real progress as a nation is in the proper conservation of the soil; that the bulwark of all our country's bigness is agriculture, and that farming has ceased to be a habit. "When we remember that the farmer can conserve moisture and fertilize a parched soil, that he can rotate his crops and intensify his farming, that he can breed new cereals, and graft upon a hardy American plant the life and substance of another clime, we can readily understand that there is a science in all this; and seeing the importance of scientific thought and study in this most important branch of industry, we also realize the wonderful possibilities in the reach of every landholder in the state of Kansas."

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We are in the dawn of a new day. The times have changed. The man who has given his best years to agricultural pursuits, the man who has a wide and successful experience on the farm, is needed there to direct, to manage, to infuse new life. The young man can do the work better, and at the same time reap better crops, if he has the advice of one who is mature in judgment and ripe in experience to oversee.

"We can readily see why there is a demand for men of long experience in business circles—men who have a thorough knowledge of the principles that govern the business world, as well as that of successful business methods—but we must rise to the height of our privilege with regard to ideal farm life. 'The old man triumphant' is returning to the mastery of the earth in all lines of activity, as in ancient days when the people wisely recognized the superiority of the old, as leaders and rulers"—and why should farming be an exception to the rule?

"England is awakening to this knowledge, and 'too young at sixty' is the slogan that has thrilled the soul and sent the blood leaping through the veins of every elderly man in that country."

"England, America and other countries might point to hundreds of men and women who have passed the allotted three score years and ten whose rare business acumen and unerring judgment are the admiration and envy of the younger men of affairs. The man of ripened experience is rapidly climbing back to his seat of power, and the world will be the better through having the benefit of his ripe experience, his mellow judgment and his broader outlook on life. With him the old prejudices have passed away with the years; personal aggrandizement is lost sight of, and the good of the people lies close to his heart in a way not possible with the young man, who is ambitious to succeed, whose views of life are narrow, as befits those whose experience has been too limited to enlarge the horizon."

"For age is opportunity no less than youth, itself, though in another dress," writes Tennyson. And that the opportunities are being taken advantage of by hundreds of men and women is being demonstrated in a manner that clearly leaves no room for doubt; for in this and every other civilized country there is rapidly accumulating strong evidence that "in every line of life the aged one is resuming his or her rightful preeminence."

There has been a gradual turning to life in the country, in contrast to the regular grind of city life, but what we need most of all is a total change toward farming, as a people. With rural delivery, telephone connection, good roads, motor cars, interurban lines, we prophesy in the no distant future a rural life doubly attractive to our young people—a healthful and wholesome social life, modern conveniences in every farm home, and the drudgery that once stigmatized country life and rendered it unpopular a thing of the past.

The retired farmer will no longer plan to leave the rural regions and come to the town or city to settle down to a life of inactivity, but, with strength subserved by observing hygienic rules, will still continue to enjoy life and will be an integral part of the life he has helped to make. The town and the country will be so blended together in their efforts to help and strengthen each other that their interests will be in common, their aims and aspirations will be similar in this—that each will strive to get the most out of life.

When these ideal conditions exist our industrial school girl will find farm life preferable to city life and will enjoy the freedom of the larger life where fresh air abounds; "where the birds sing their sweetest songs; where the squirrel plays undisturbed; where she can run and jump and ride and work; where she may sit undisturbed in the shade of trees and watch the reapers at work or follow the cattle as they graze; where she can learn and know, as one knows a mother's face, every change that comes over the heavens from the dewy freshness of early dawn to the restful calm of evening." This new life will appeal to her and there is where she should go.

THE GROWING OF THE HUMAN PLANT.

By The Rev. FRANK L. LOVELAND, Topeka, at the Board's Fortieth Annual Meeting.

I have been asked to talk to you about the growing of a human plant. I am here to talk to you upon a question that I think is of vital importance, following this very delightful, ingenuous and at the same time pathetic plea for the coming of the Prince. I only want to stop right here to say that if the young men of Kansas and of this Middle West are as slow as they are made out to be, they surely are not as they were when you and I were young.

There will be a general agreement, I am sure, that the greatest products that you are raising in this western country are not your cattle and your hogs, your corn or your alfalfa. Your richest assets are not your bank stocks nor your rich farms. Your richest assets are your boys and girls. The American child is our greatest asset, and towering above every other question, above the questions of finance, of the tariff, of transportation, of insurgency or standpatism, is the question: What kind of men and women are we raising in this country?

'T is now well known that America is to be the theater of the world's activities to-morrow, for the reason that this continent has a million square miles of more tillable soil than all of Europe, Asia and Africa combined. Five-sixths of the fresh water of the globe is upon this continent. The star of empire is now here in this West, and it is the uttermost West, and here is the theater for the great activities of the world to-morrow, and the question as to the character of your boys and your girls that you are to raise is of infinitely more importance than the kind of hogs and cattle that you are to raise. We are told that America is money-mad, that we have now a modern insanity, based entirely upon a golden glint. This may or may not be true, but I believe that such states as the commonwealth of Kansas should be the leader in bringing to the American people a return of that sanity which shall have to do with fundamental principles of manhood. Therefore, ladies and gentlemen, I have no hesitancy in standing before you to-night to make a plea for the child as the best American asset.

Two thousand years ago human flesh was cheaper than beef. Pollio could feed his lampreys upon human flesh because it was cheaper than mutton. Jesus Christ once discussed with the Pharisees the question as to whether a man was any better than a sheep. And are you aware of the fact that it is only within the lifetime of the men who are sitting before me that any nation on earth has taken any step to study the culture and the care and the preservation of the child as a national asset? England sixty or seventy years ago was herding its pauper children, its waifs and its orphans, by the thousands into her mines and factories, to work them to death before the children were twelve years of age; and it was Charles Dickens who had to literally take a child up in his arms and batter down the bastiles of cruelty that England was using for the incarceration of its childhood. Do you know that it is only within the two last decades in this country that we have begun to study the child as a national asset? and to-day the psychologist is peering into the face of the child, the physiologist is rumaging among its vital organs, the surgeon is delving into it, the state is studying it as never before in its history. It is only within the last fifteen years, Mr. Chairman, that the church has tried to work with the child with the end in view of saving it from hell now instead of hereafter, and saving it to heaven now instead of heaven hereafter.

Therefore, in view of the fact that we are now studying him as a national asset, it makes us go back to the fundamental principles of biology and of life in its growth for a study of the child. Therefore I want to be for a few minutes very specific in some things that I shall say to you people who represent the great knowledge that is now being utilized in the growth of the plant and animal life in this great commonwealth of ours. Science is teaching us some lessons that can not be misunderstood, and I stand here as a representative of the church, as a minister of the Gospel, to make some confessions to you to-night that may make some one say that I am a heretic unburned, but I believe are necessary to be said in this day and generation.

Now, ladies and gentlemen, in the growing of a human plant, as in the growing of a grain or an animal, the first fundamental principle is this: that it must be well born. Will you agree with that? It must be well born. Science is a unit in declaring that heredity is of vital importance in the growth of plants and animals and man. We are now learning that this law applies to the child as well as to a Poland-China or to a Shorthorn. For instance, the church used to stress this one point alone: "Ye must be born again." That is good; but, ladies and gentlemen, it pays just as well to be born well the first time as it does the second time.

It was my privilege to study Mr. Luther Burbank's wondrous institution yonder in California and to hear Mr. Burbank say this: "That there is not a single quality that you may desire in a plant but what you can, by culture and cross-breeding, bring into it." I heard Mr. Burbank say that there was such a thing as a vegetable crime, meaning by that, that if we allowed a defective or a diseased plant to be used in the propagation of itself with another plant of that sort of character,

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you were committing a vegetable crime. You farmers have already discovered that the runt, the scrub, the cull must go. In your great agricultural institutions, in your corn shows and your horticultural societies, you learn the science of breeding plants. You farmers know that it is now an agricultural crime to allow an acre of land to produce but ten bushels when it ought to be producing one hundred bushels. You know it is a crime against the science and art of farming to allow the runt, the scrub, the diseased, the weak, the defective animal to propagate itself. It goes to the market, to the vat, but never to the breeding paddock.

And, gentlemen, are you willing to agree that it is necessary for us to recognize that this same law holds for your boys and your girls? Heredity is vital here, and in the raising of boys and girls it is just as necessary to study the law of breeding as it is in your plants and your animals. Some one, Mr. Secretary, last June, was kind enough to send me a copy of the *American Breeders' Journal* (I think that is the name of it), of which the assistant secretary of agriculture in Washington, Mr. Hays, is the editor, and in that journal, in its initial number, this information was given out: that the American Breeders' Association of this country are to take steps to organize, in every state of this Union, stations for the study of eugenics, or the science of breeding up the human family. Now, I know to a lot of people who are very sanctimonious, and are only waiting to go to heaven when they die, that will seem very repugnant, because they have vainly imagined that a mourners' bench would cure every ill that the human race is heir to; but I have gotten over that notion myself, if I ever had it, for this reason: Ladies and gentlemen, the agricultural societies and the schools of science in this country have come around to the place where they are now putting a premium upon that old statement, made away back yonder the other side of the Cross, namely, this: that the sins of the fathers may be visited upon the children to the third and the fourth generations, and that this is a flaming protest from high heaven against bad breeding.

Hear me! What we need to learn is this, that blood in men, as well as animals, transmits physical weakness, mental decay, moral degeneracy! that a father may literally damn his offspring; that a mother's profligacy may decree her daughter's dishonor; that parental iniquity may predestinate filial crime; and that just as the farmer to-day shall no longer allow the runt and the scrub, the diseased and the defective to propagate, so there should be steps taken in this great land of ours to see that the same law shall apply among men as among animals. You may not agree with that. The beauty of it is, I do not care whether you do or not, but I believe it is absolutely fundamental.

Hear me! A surgical operation was performed not long since in a neighboring city upon the head of a lad who was about ten years of age. He seemed to be a natural-born thief. He would steal everything he could get his hands on. They called him a kleptomaniac. They were going to send him to a reform school. He was kept for a surgical operation, when it was found that he had been hit on the head several years before, when he was a little fellow, with a ball bat, and his skull had

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been caved in a little. They took him to the hospital, performed an operation, lifted the skull, remover the pressure off of that brain, with the result that that boy became as honest as any boy in the city and never again seemed to have a proclivity to steal. What I am getting at is this: heredity may strike a blow that shall produce a misshapen skull and give to communities a moral pervert. I used to think that the thing a boy needed was a mourners' bench and a preacher, that that would cure him, but I have gotten over that. He did not need a mourners' bench; he needed a surgeon's knife.

Now, then, are we sufficiently aware of the fact that in growing boys and girls we must study this problem? With Theodore Roosevelt I usually most cordially agree, but he has one theory with which I take a great deal of comfort in disagreeing. I refer to his opinions on race suicide. All that he ever had to say upon the question was a stimulus for the wrong fellows, and he was primarily wrong in this: History has never yet shown where a nation went down because of lack of numbers, but history shows that the stream of time is covered with the wrecks of nations that have gone down for the lack of moral worth; and this nation is not in danger from race suicide, but it is in danger from racial degeneracy, and that is our problem. You look about you, in our cities especially, and see the pitiful products of heredity, the diseased, the defectives, the delinquents, that are just as much the result of bad breeding as are your nubbins and your scrubs on your farms; and these, my hearers, can not be cured in any other way that shall maintain a high standard of civilization unless you shall use the same scientific methods in dealing with these that you use in dealing with their similars in the realm of plant and animal life.

Hear me! We used to believe that blindness, deafness, tuberculosis, rheumatism, and a score or more of other kindred diseases, were afflictions sent from Almighty God, and that we had to endure them the same as we do the devastations of a cyclone, with a prayer for grace to sustain us in the awful affliction. Ladies and gentlemen, what we need in a case of that kind is not grace, but sense—good, old-fashioned horse sense, Mr. Secretary—which will teach us that these things are not afflictions sent from Almighty God upon us, but are the results of stupidity and ignorance in the breeding of men and in the carrying on of our modern civilization. Not long since I sent out two hundred letters to leading surgeons and oculists, physicians of this country, asking them a question concerning blindness, for I had been startled by a statement made by Hellen Kellar, the blind, deaf and dumb girl, concerning blindness. I asked those surgeons and oculists and other leading scientists a question, as to whether her statement was correct that seventy-five per cent of the blindness by which children are handicapped from birth in this country was caused by a certain form of ophthalmia for which the parents were responsible before the child was born, and nearly every one of the doctors gave me a reply that her figures of the percentage were a little low, rather than too high. Now, ladies and gentlemen, if this thing is true, does it not mean that in the growing of a child, in the promoting of a human plant, you should, as farmers, as agriculturists of this great

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state, begin to lay more stress upon this vital question in the American home? I agree with you that it is a great thing to care for a hog or a steer, I agree with you that it is a great thing to have the federal government stir itself mightily if some disease or some wrongful thing comes in that hurts your animal products, but I would to God that we could have a national secretary, or, if you please, a department of humanity, in this great land of ours, with a man like Secretary Coburn, for instance, with a brain as big as his and with a zeal as great as his, who would go up and down the highways of this great nation preaching protection and preservation of the boys and the girls from bad breeding.

We preachers have, for a long time, thrown one fit after another, especially at legislative occasions, on the subject of divorce. The trouble is, gentlemen, that we have our fit too late. That is not the place to commence to remedy this. The place to begin the remedy of this question is at the marriage altar and at the courthouse where the license is issued. If I had my way about it, no man or woman should ever be married until they could present a physician's certificate showing that they at least were physically clean and not physically defective. You farmers, if you have a fine heifer or a fine young colt, take exceeding care to see to it that they are not mated with anything but the best, yet you will have a beautiful daughter, a queen, and then allow some lousy scrub to tag around after her, and marry her the first thing you know. In other words, folks, help us to bring the time when it shall be considered a crime to breed the diseased and the defective and the criminal stock that we are raising in this country by the multiplied thousands. As a churchman, I just simply throw up my hands over that proposition, of ever solving it until we can solve it along scientific lines as well as religious lines. The Gospel of Jesus Christ will do all it was ever expected to, but it is not expected to remedy the fool mistakes of people who are supposed to have brains. Therefore, the fundamental thing in the growing of a human plant is to give it, first, a good start. Secondly, I think the child should not only have a good start, but it should have a chance to develop after it is started. Now, to be concrete with what I mean, and I am not going to speak in parables at all: The United States census shows that to-night there are over three million in this country that are being literally damned because they are dwarfed and stunted and hamstrung in their chances, for life. They are in our factories, our mills, our mines. For illustration, there are 50,000 boys and girls under fourteen years of age that are working in mines and factories in this country in order that you may have cheap coal. There are 150,000 children between the ages of five and thirteen that are being robbed of every one of their rights as a child, the right to grow up and develop, because they have to work in the textile factories, in order that you women may attend a sale and get cheap muslins, and in order that some of you fellows may send down to Sears & Ward, or Montgomery & Roebuck, and get something a little cheaper than you care to pay a decent price for. I would just like to stay here half an hour on this question. Suffice it to tell you that there are three million children in this country that are more afraid to live than they are to die; that are robbed of the vital liquors of life in the very commencement of their being in this infernal child labor that is going on in this country in order that we good people may have things just a little bit cheaper. What is the result of it? That those people that come up through those conditions become anemic, stunted, dwarfed. You see it in the spindle shanks, the pale eyes, the sodden faces, the dwarfed and shrunken forms. These, Mr. Chairman, form a soil in which the contagious diseases of this country sow their seed and form a menace to our whole nation. You say to me, you people of Kansas, "Doctor, what is the use? We have n't anything of this sort in Kansas? What 's the difference?" Let me ask you a question. Where did that diphtheria start from in your community? Where did that smallpox come from? Where did these contagious diseases come from? I will tell you how you got some of it. When you sent down to that place for those cheap, shoddy clothes that you could buy for $1.49, you got it from places where it was made by these people who have grown up anemic and diseased, tuberculous, scrofulous and syphilitic. I have seen them in the sweatshops, exuding their sputum out over the clothing that is made in these shops and sent out over these plains to be sold. You bought the suit for $1.49, but you did not pay enough for it, for you bought a case of smallpox with it that you should have paid for, and started it in your community. Out of this anemic crowd come your 300,000 tramps that are overrunning this country to-day. What started that scarlet fever yesterday in your neighboring town? Out of this class probably came the tramp who slept last night in some vile den in Kansas City, got on a freight train, stopped at your door for a handout, and your little girl that clung to the mother's skirt when the mother gave the tramp a handout is soon flushed with scarlet fever, and then the good Christian mother goes to her knees in prayer, wondering why God sent this affliction. God had n't anything to do with it. It is an outgrowth of conditions for which society is responsible. It is a terrible responsibility for people to thoughtlessly populate a city with diseased and delinquent children, but it is a more terrible crime against the children themselves to be brought up under these conditions; and I say to you people of Kansas, you who represent the brawn as well as the brain of this state, in the name of our God and the name of our civilization, begin to pay pretty careful attention to the fundamental principles that underlie the growing of a child. That is what is necessary. In growing a human plant, you not only have to give it a good start, but you ought to cultivate it pretty carefully or give it a chance to have that cultivation.

I am not going to bring any indictment against our public schools especially. I believe the public-school system in its beginning filled most splendidly the field that it was calculated and expected to fill. But I am here to say to you to-night that in my opinion the public school has become too much of an educational institution that looks out for the class rather than the mass. Let me tell you what I mean. Only ten per cent of our American people go into the professions. Ninety per cent of them go out into the industrial realms. And yet in the energy, the brains, the efforts, too much of our high-school system is in the interest of the ten per cent against the ninety per cent, and I am glad that Topeka and the state of Kansas are taking the lead in pioneering a new regime educationally; but do you know that I think about ninety-five per cent yet of the fellows who make the curriculums and courses of study for our high schools have forgotten that it is possible for a boy to be educated with a tool as well as with a book?

Hear me again: Only two per cent of the American people ever go to college. Put that down. And yet your high-school curriculums in the state are builded for one particular and specific purpose, if they are an accredited high school, which is this, that the graduates of your high school may do—what? May enter as freshmen in a university or college. I am not saying anything against the two per cent; I am not saying a word against the ten per cent that go into professions, like you and me —especially you; but I want to lift my voice here to-night in a plea for the fellow that can not go to college and that has not the desire to be a professional man. The facts are, my hearers, that the day must come very speedily when the boy or the youth that graduates from one of our public schools shall be fitted for practical every-day life and know what to do. I believe that if our girls had that kind of an education they would not have to wait so long; they would go out and get what they wanted.

I believe another thing: that this boy of ours must not only have this right given him in the public school to fit him for his practical life, but that he should not be one of that class that Prof. Luther Gulick referred to when he said it was a terrible indictment of our public-school system when three-quarters of a million dropped out of the public schools before they passed the grade age, and did so because the course of study was not such as ministered to that which they wanted and which they needed. Then another thing that he tells us is that too many of them are compelled to drop out and are not allowed to get an education because of physical defects which could be remedied by medical inspection of the schools. Do you know that eighty-five per cent of the delinquent boys and girls in this country are delinquent because of physical defects, which, if they were remedied, would enable the children to be educated in our public schools?

The pressure in the public school must be taken off in the interests of the well-being of the child. The child enters the grades. Every child is compelled to toe the crack of the grade; the dull child must compete with the bright one, the weak one with the strong child. If they have feeling at all, to fail in the passing of their grade is a disgrace, with the result that faint, yet pursuing, the weak child and the dull child keep up the race, with the further result that when the diploma comes it is quite often an unused diploma, because the health has been literally blasted by the pressure that has been put on. When my daughter—God bless her!—was twelve years old she was ready for the high school, and the teacher came to me and said, "Doctor, we can graduate her when she is fifteen." I said, "Not much, you won't"; and I almost had a fight to keep that girl out of school, but I took her out and kept her out for twelve months. I told her to just turn loose, that her health was worth more than anything else, and when she did go back to school

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it took five years instead of four for her to graduate, and she did it against the protest of the faculty; but when she came through and had her diploma, thank God she had some health—that was worth more to her than her diploma. This is what I am talking about.

We take great pride in the birth of our American republic, but it is just as important for this nation to live as it was for it to be born. Shall this government of the people, by the people and for the people perish from the face of the earth? is a question of greater importance to-day than it was when Lincoln spoke those wondrous words by the bloody billows of Gettysburg. "The land of the free," this country that stands for greatness, means more to-day to us than it meant to Washington when he prayed at the snowy altar of Valley Forge, and, ladies and gentlemen, the preservation of the childhood of this country, the character of the men and women we are raising, the type of intellect that we are cultivating, the moral peoples that we are generating, and the physical heroes that we are breeding—these are the great questions for this great state of Kansas.

FARM LIFE INDUCEMENTS FOR YOUNG MEN.

By Geo P. Bellows, Maryville, Mo., at the Board's forty-first annual meeting.

A live man, your secretary, the Hon. F. D. Coburn, has assigned me a live subject, one commanding the attention of our best thinkers. It is a subject involving the interests of the individual young man and society in general. In theory the solution of the subject seems not so difficult. In practice there are obstacles to overcome. One of the chief difficulties is to convince our young men that there are farm inducements equal if not superior to inducements offered in other lines of endeavor. In the past the inclinations of all too many young men have led them to drift away from the farm. Sometimes the inducement leading to such action was the desire for an easier life, financial considerations, or the eminently less excusable passion of merely seeking a good time. A certain per cent have succeeded in establishing themselves, but, almost without an exception, those having won success credit what they have accomplished to the training of a good father and mother, together with habits of morality, industry and thrift inculcated during their "growing-up" days on the farm.

One thing that has and is likely still to mislead many an otherwise well-intentioned young man is the fact that the young man who leaves the farm and wins success is given much publicity and favorable advertising, while the nine hundred and ninety-nine of his compatriots who have either utterly failed, or at best have only succeeded in merely hanging on to the fringes of respectability, have scarcely had a line or a thought and are forgotten.

Aside from his love affairs, there is likely no subject in which the average young man should be more concerned than the subject, "What shall I choose for a business, profession or life work?" This is a critical period, and it is to be deplored that public sentiment up to comparatively recent times has been such as to lend slight inducement for him to decide in favor of the farm. Happily, public sentiment is rapidly changing in this matter, and the farmer is coming to be looked upon, not only as a most dignified and respectable member of society, but his business is also regarded as most desirable and one well calculated to develop the better side of his life.

While public sentiment has not been sufficiently helpful in stimulating and impressing upon our young men the advantages of farm life, there is still another influence that has operated to the disadvantage of the development of farm inducements, and that is our highly prized and beloved public-school system. While the public school is an institution in which we all hold commendable pride, yet it must be admitted that it has been educating our children away from rather than towards the farm. Already steps of vast import have been taken calculated to correct this mistake, and the children in many public schools are now being instructed in the rudimentary elements of agriculture and plant life, this cultivating a taste, understanding of and love for the soil and the things connected therewith. This movement should have a nation-wide, hearty and enthusiastic support.

Notwithstanding the fact that we and our predecessors may not have done what was best to advance the cause of agriculture, yet we have conscientiously done what we considered best. During this time the professions and commercialism have beckoned and courted the young men of the country in numbers out of proportion with consistency, yet it must be plain that, for the present, and for generations to come, farm inducements for young men are and will be sufficiently numerous to convince any young man of ordinary intelligence and sincerity of purpose that no line of endeavor has more of the permanently good things of life to offer than farming and its allied interests.

One of the greatest of all farm inducements for young men is the admitted fact that the farm offers and provides vastly superior advantages for wisely and economically building and establishing a home. It affords ideal environments for the cultivation of the moral, intellectual, physical, spiritual, social, independent and financial sides of life, all of which are so necessary for the perfect development of a well-balanced, sterling character.

The home on the farm is the center of all the activities of the establishment, a hive of usefulness where each occupant comes to be most easily and naturally a sympathetic and necessary part of the whole. Under such working conditions respect, obedience, love and industry germinate, thrive and blossom as the rose, bringing forth a degree of confidence, joy and contentment that makes the home the dearest and best place on earth.

Such homes radiate influences for good to the uttermost parts of the world, and control, in large measure, the business and social status of our nation. Hence, as a place to rear a family the farm home stands out in bold relief, preëminently the best. Thus it is that the farm home furnishes the base of supplies from which come men and women grounded in right views of correct thinking and proper living.

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Bad morals and vice are usually the results of idleness or undesirable companions. Farm life, as a rule, implies conditions exactly the opposite. There may have been a time when the advantages for intellectual development were not as favorable on the farm as elsewhere, but that time is past, as the records of country bred and reared boys and girls in college, scientific, mechanical or professional life amply testify.

"The body is the home of the soul." How essential, then, that the young man choose the vocation that tends to the development of that temple. For this purpose the out-of-doors life of the farmer, with its varied labors, stands in a class by itself. Such activities bring into use every muscle of the body, stimulate appetite and intensify digestion. When the day is finished, ideal conditions are presented for reflection, uninterrupted sleep and rest. Such living builds and supplies that rugged physicial manhood of the type continually demanded to fill the ranks of the workers and thinkers in the congested centers and business parts of the world. It is to be hoped that much more of this farm-life physical energy will in the future be kept where it rightfully and logically belongs—in the pursuits of agricultural production. In amplification of this position, and as a demonstration of the inducements that farm life holds along these lines, a further consideration of the comparative lives of the farm and city dweller will not be amiss.

Health is a heritage of the farm. It is the embodiment of energy, stamina, initiative and virility. In cities laborers who thrive by right of muscle alone are employed largely in the grinding work of mechanics, where they must toil under more or less unwholesome conditions, which tends rapidly to deplete their physical strength and sooner or later leaves them without position and with little left for their declining years. The city man intellectually occupied too frequently becomes pale, nervous and worn in the fetid atmosphere of confinement. The city is a marsh light. It lures with its glitter and gayety, its theaters and clubs, its kaleidoscopic activities, but eventually the dweller of the city pays dearly for the privilege of congestion and contamination, because the time comes when the lights cease to entice and the myriad noises become maddening. When the experienced eye, looking below the surface of things, views the tragedies of the city, observes the brain-weary, nerve-racking, gruelling strain of fierce competitive business methods, and witnesses daily the wrecks of disappointed lives unable to "make good" in the grind, it is then that he longs for that indefinable, soothing and consoling something which we term Nature, and yearns for that bodily fitness which is found at its best in the open life and pure air of the country. Yes, health is one of the strongest inducements the farm offers, and this is true now more than at any time in the past, because, in addition to natural favorable environments, the farmer of to-day is guided more by scientific methods of living, systematically and conscientiously executed, which operate as surely as cause and effect for his physical betterment.

On the spiritual side of this question we need but to touch. It is said that "to commune with Nature is to speak with God." Certain it is that the dwellers on the farm are brought into such close relationship

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with Nature that, consciously and subconsciously, the feeling of reverence for the Omnipotent Creator of All is born, and, expressed or unexpressed, pervades their character even as the odor of flowers sweetens the air.

The social side of country life is not as highly developed as many would like. So far it is wholesome and genuine and warm with the cheer of a real hospitality, absolutely refreshing to those whose experience and observation have led them to weary of the fictitious value and shallow conventionalities of much of so-called society. Among country people distance and the resulting inability to keep in touch with current events is rapidly being overcome in innumerable ways not necessary to specify here. Modern inventions and improved facilities for equipping and beautifying the home are gradually supplying a long-felt want, and as our country people continue to prosper and acquire a higher standard of ideals of thinking and living, and are thus brought into a broader and yet closer touch with humanity in general, the question of the social side of country life will easily solve itself.

Another prime inducement for young men on the farm is independence. Independence is a magic word—the dream-ideal of mankind, never fully acquired, but probably more nearly realized by the farmer than any other. He has it in his power to produce the majority of the necessities required for the comfort of himself and family; furthermore, to have and use them in their freshest, best and most wholesome condition. Acquiring this, the balance of his income can be turned to gratifying other desires or placed to the credit of his bank account. The cost of living in the country is much less, compared with an equal standard of living, than in the city. The expense of city life is too frequently burdensome. It is safe to say that for each one in the city with a financial surplus at the end of the year, there are hundreds who bid each year farewell with unpaid obligations on hand—debts. No man can be independent who is annoyed by petty debts, and debt is the heritage of many in metropolitan life. The farmer is not always free from debt, but obligations are amply secured by real property and usually the debt is incurred for substantial, remunerative business purposes. The majority of city dwellers work for some one other than themselves, hence have little independence or initiative. They obey orders, and the free man within them becomes a more or less passive human machine, incapable after a time, through force of long habit, of effective independent action. The farmer may complain that his work is never done. Neither is that of the order-driven city man. On the other hand, the farmer has the satisfaction and pleasure of working for himself, thereby bringing into his life that uplift of spirit that can come only through such independence. The farmer plans his own ways, and while doing so is developing himself into a better, more useful and desirable citizen, honorably filling a niche in the universal plan for the betterment of humanity. In short, he is as nearly independent as it is possible to be and live with and among people.

Financial farm-life inducements for young men are so numerous and varied as to afford wide latitude for individual taste and inclination. The tendency and temperment of the American people have been such as to place a premium on financial success until the disposition to succeed financially has, in a measure, overshadowed other considerations. Thus it is that this phase of the subject is the one which the average young man would likely consider first. Although of importance, it should not, in my opinion, be the controlling consideration. In other words, it is not in harmony with my views that success in life should be measured by the mere accumulation of money, providing it be accomplished at the expense of either moral stamina or intellectual attainments. Too often we count assets purely in dollars and cents. Gold is only one commodity; others there are quite as desirable. Health, for instance, is far beyond the price of purchase. Without it, what is life? Character is of greater value than diamonds or rubies, and without it a man becomes a nonentity. Intellectual acumen and soul growth—where so well developed as in the natural and quiet surroundings of the home?

For these reasons I have not given precedence to financial considerations.

Some extremely active ambitious young man, who perhaps may be slightly tinctured with the "get-rich-quick" idea, will doubtless argue that the farm and farm life are all right, but do not offer sufficient scope for speculation, etc., and is entirely too slow for him. In answer I assert that for the man of trained mind, judgment and practical working knowledge of the soil, its products and live-stock husbandry, the field for financial speculation has been, is, and will continue to be broad, and, what is more, incomparably safer than in most other lines. Some young men may claim that the monotony and isolation incident to farm life robs it of all inducements for a bright, affable and energetic young man's activities and capacity for initiative. The reply is: Any young man who permits himself to believe he is too smart to be a farmer either very much overestimates himself or underestimates the gigantic proportions and possibilities of agriculture and its allied interests, all of which open up nature's laboratory, so broad in its diversities as to be almost incomprehensible.

Success financially, as in any line of effort, is rarely attained except as result of work well done. Right here I wish to emphasize the old adage that "Genius is largely the capacity for hard work." I know of no legitimate business, for a young man with limited or a fair amount of capital, which promises more liberal returns of every desirable nature, in proportion to the effort expended in preparation and operation, than farming. The investment of money in a farm home becomes a young man's best savings bank. He derives profit, not only in the increase in the land's value, but also on his crops and animal increase. It is safer than most investments, with less fluctuation of values; and when after a term of years he makes a clearing up he is amazed to find himself the possessor of a snug bunch of capital, in amount proportioned to the original investment and the amount of personal energy and thrift he and his family have put into the effort.

Farm-life inducement for young men, considered solely along financial lines, is based upon the indisputable fact that knowledge of the soil and understanding of the farmer is of inestimable value to those professionally, scientifically and commercially engaged. Therefore young men should not neglect farm-life training nor underestimate its value, even

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though the inclination may lead them into other lines of activity. In considering farm-life financial inducements the important fact must not be overlooked, that with the population of towns and cities increasing at a much more rapid rate than urban population, and with cost of living advancing in a fairly corresponding ratio, it is little wonder that the attention of thoughtful people is being focussed upon the sound economical questions involving improved farming methods and increased soil production. Realizing that a more general healthful and vigorous public sentiment should be established and better methods should be put into farm practice, national and state governments have been coöperating, to the end that many new ideas and scientific principles are being introduced, and slowly, but nevertheless surely, these are taking the place of shiftless and more or less antiquated habits. While much progress is apparent, yet so large and varied is our farming area, and the temperament and inclinations of our farming population is of such diversity, that only a fair beginning has been made in the matter of reaching and educating the great bulk of soil tillers. It will be years, if not generations, under existing conditions before any great per cent of our farm lands will be brought to the maximum of production with the minimum of waste.

It must therefore be concluded that the prices for farm products will continue upon a remunerative basis. Considered from a financial standpoint, the above unalterable facts stand out as monumental inducements for young men to engage in farming. Some young men will say, Your plan works out nicely in theory, but is not so easy to put into practice. The answer is: All too many young men are seeking the so-called easy places, apparently not realizing that position and success are not found at the end of the avenue of easy places.

Young men desirous of being connected with, interested in and a part of one of the best established and growing enterprises, a business with the world as a customer and consumer of your products, should not fail to give favorable consideration to farm inducements. Remember, young man, that you are living in a time and in a country of boundless opportunity—that the right-minded and properly disposed hired man of to-day not only may but can become the owner of a comfortable farm home in as short a time, if not shorter, than its equivalent can be acquired in most any other line of endeavor.

Financial inducements in abundance are offered young men who will specialize and prepare intelligently to apply themselves as breeders and improvers of pedigreed live stock, farm seeds, horticultural products, etc. Dairying, farm management, soil conservation, agricultural engineering, irrigation, etc., are subjects to which the young man may profitably turn his attention.

In conclusion, I wish briefly to emphasize a few obvious facts which young men will do well to take into consideration before giving up or abandoning the idea that farm-life inducements hold no charm for them.

At no other period in the history of our country has the farmer, the farm and its products been of so great public concern as the present. No longer is the farmer and his business the subject of ridicule or sneer, except by the thoughtless or those wholly indifferent to the real worth-while things of life.

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Thanks to our state agricultural societies, agricultural colleges, experiment stations and the agricultural press, aided and abetted by stern necessity, society in general is now cultivating a wholesome respect for the farmer, the man who, figuratively speaking, holds the keys to life's necessities, to say nothing of its luxuries.

The banker, merchant, railroad president and manufacturer, together will all classes of business and professional men, not excepting politicians, have come to recognize that the farmer is the backbone of the country. There may have been a time when business and politics thrived and fattened upon the credulity or eccentricities of the farmer. Happily, conditions are changing, to the end that the wishes and demands of the level-headed, self-respecting and dignified farmer are now being considered as never before.

The above conclusions are not the results of imagination, much less the desire to flatter the farmer, but are deductions made from a rather unusual field of observation and contact with people engaged in or representing almost all fields of endeavor. I therefore assert that the foundation for my subject, farm-life inducements for young men, is established on the solid rock of truth, and that there are inducements of the most substantial character.

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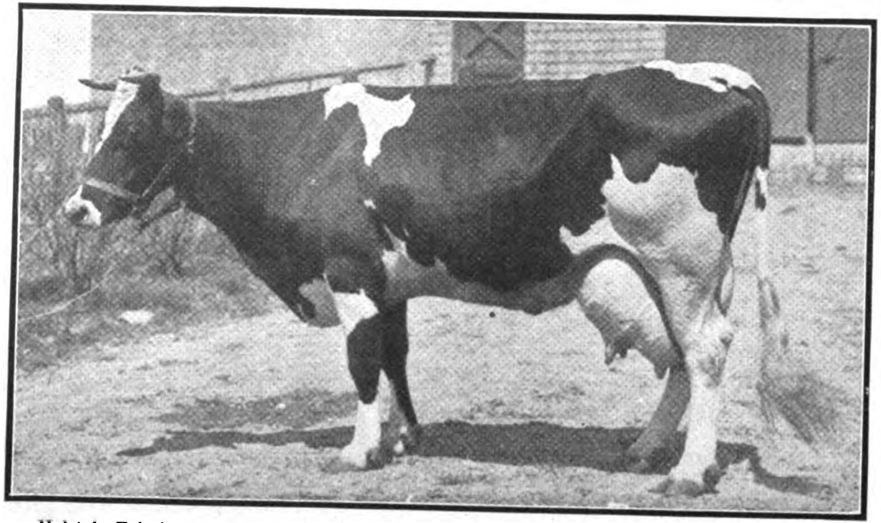

Holstein-Friesian cow Creamelle Vale, champion milk cow of the world, with a record of 29,653.4 pounds in one year. The record of no other cow approaches this.

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PROCEEDINGS

OF THE FORTIETH ANNUAL MEETING OF THE KANSAS STATE BOARD OF AGRICULTURE, HELD IN TOPEKA, JANUARY 11, 12, 13, 1911.

WEDNESDAY, January 11, 1911.

The meeting was called to order by President Chas. E. Sutton, in the office of the State Board of Agriculture, at four o'clock P. M.

The roll of members was called by Secretary Coburn, and a quorum declared present.

On motion, the president named committees as follows:

On credentials: T. A. Hubbard, of Sumner county; A. L. Sponsler. of Reno county; Ira D. Brougher, of Barton county; E. N. McCormack, of Allen county; Peter Pfeiffer, of Brown county, and C. A. Johnson, of Russell county.

On resolutions: A. W. Smith, of McPherson county; Edwin Taylor, of Wyandotte county; I. L. Diesem, of Finney county; D. C. Bowersox, of Republic county; E. E. Frizell, of Pawnee county; Robt. H. Hazlett, of Butler county, and B. V. Wheeler, of Norton county.

The minutes of the previous annual meeting were read and approved.

The committee on credentials made its report, which was adopted, showing the following-named as duly authorized delegates to the fortieth annual meeting of the Kansas State Board of Agriculture:

Joe Eastwood, Allen county; E. N. McCormack, Allen county; Ira D. Bougher, Barton county; Peter Pfeiffer, Brown county; Robt. H. Hazlett, Butler county; Wm. Hilton, Butler county; Jonas D. Schooley, Clay county; Emery Babb, Clay county; John Lytle, Coffey county; J. C. Gatton, Cowley county; P. H. Albright, Cowley county; A. H. Diehl, Dickinson county; C. O. Bowman, Douglas county; T. P. Hawkins, Elk county; W. M. Kinnison, Finney county; Geo. Stauth, Ford county; J. E. Shinn, Franklin county; Charley Bull, Gray county; B. P. McKee, Harper county; B. W. Edwards, Harper county; Ralph Snyder, Jefferson county; J. A. Aaron, Leavenworth county; C. A. Galt, Linn county; Geo. M. Fowler, Lyon county; H. A. Rowland, McPherson county; E. C. Logan, Mitchell county; H. M. Casebeer, Montgomery county; Clyde Hollingsworth, Montgomery county; Geo. J. Pfister, Montgomery county; W. H. Smith, Nemaha county; E. S. Myers, Neosho county; Frank Miller, Ness county; B. V. Wheeler, Norton county; John I. Brown, Ottawa county; E. E. Frizell, Pawnee county; Walter Pedigo, Pratt county; James Haston, Reno county; D. C. Bowersox, Republic county; F. C. Otto, Riley county; Chas. Riseley, Rooks county; T. C. Rudicel, Rush county; C. A. Johnson, Russell county; T. H. Terry, Saline county; J. W. Going,

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Shawnee county; O. A. Scott, Smith county; J. L. Neill, Stafford county, and Geo. A. Blair, Sumner county.

Adjourned until 7:30 P. M.

WEDNESDAY EVENING SESSION.

President Sutton called the meeting to order, in Representative hall, at 7:30 P. M.

Prayer was offered by Rev. R. K. Pooley, Canon of Grace Cathedral, Topeka.

Roll-call; quorum present.

Welcoming addresses were delivered by Governor W. R. Stubbs, on behalf of the state, and E. R. Simon, county attorney, on behalf of Shawnee county and the city of Topeka, President Sutton responding.

Papers were read by Dr. F. S. Schoenleber, of the State Agricultural College, on "The Present Status and Future Outlook of the Serum Treatment for Prevention of Hog Cholera," and B. O. Cowan, Assistant Secretary of the American Shorthorn Breeders' Association, Chicago, on "Beef Production."

Adjourned until 9:30 A. M.

THURSDAY MORNING, JANUARY 12, 1911.

The Board met pursuant to adjournment, in Knights and Ladies of Security hall, President Sutton in the chair, and prayer was offered by Rev. W. W. Horn, of the English Lutheran church, Topeka.

Roll-call by the secretary.

Prof. L. L. Dyche, state fish and game warden, Pratt, read a paper on "Water Storage Possibilities," and Carleton R. Ball, of the United States Department of Agriculture, Washington, discussed "Sorghum Culture."

Adjournment until 1:30 P. M.

THURSDAY AFTERNOON SESSION.

The meeting was called to order by President Sutton at 1:30 P. M.

Addresses were delivered on "Does it Pay to Interchange or Import Seed Wheat," by Prof. W. M. Jardine, of the State Agricultural College, and "When the Cows Come Home," by Frank D. Tomson, of The *Breeder's Gazette*, Chicago.

Adjournment until 7:30 P. M.

THURSDAY EVENING SESSION.

The meeting convened at 7:30 P. M., in Representative hall, President Sutton in the chair.

Rev. Duncan C. Milner, of Chicago, delivered an address on "The Conservation of the Country Church," and Mrs. Mary Pierce Van Zile, of the State Agricultural College, read a paper entitled "Efficiency the Key Note in the Education of our Girls."

Adjournment until 9:30 A. M.

FRIDAY MORNING, JANUARY 13, 1911.

The meeting was called to order by Vice-president A. W. Smith at 9:30 A. M., in the High School Auditorium, and prayer was offered by Rev. Chas. A. Finch, of the First Christian church, Topeka.

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Addresses were delivered by E. M. Wentworth, of State Center, Iowa, on "What of the Morrow?" and Will B. Otwell, editor *Otwell's Farmer Boy*, Carlinville, Ill., on "The Story of My Farmer Boys."

Adjournment until 1:30 P. M.

FRIDAY AFTERNOON SESSION.

The meeting convened in Knights and Ladies of Security hall, pursuant to adjournment, by call of President Sutton.

Roll called by the secretary, and quorum found present.

In the election of officers and members, A. L. Sponsler nominated I. L. Diesem, of Finney county, for president for the ensuing year, and, on motion, the rules were suspended and the secretary instructed to cast the unanimous vote of the Board for Mr. Diesem, which was done, and he was declared duly elected president.

A. W. Smith, of McPherson county, having been nominated by R. B. Ward, was in the same manner elected vice president, to succeed himself; and likewise J. T. Tredway, of Allen county, nominated by T. H. Terry, was reëlected as the Board's treasurer for the ensuing year.

G. W. Glick, of Atchison county, was nominated to succeed himself as member for the ensuing two years, by A. W. Smith, who said, in part:

> "I have known for some time that Governor Glick was in a very precarious condition physically, and I understand that perhaps there is no hope for his ever recovering, or ever being with us again. For the last twenty-five years—or twenty-seven years I think it is—he has never missed a meeting of this State Board of Agriculture. He regards it as one of his children. No one has ever given this Board better counsel or better service than George W. Glick, faithful, kind, industrious, level-headed at all times. The state of Kansas and the State Board of Agriculture owe George W. Glick a debt of gratitude for the part he has taken in the building up of this great commonwealth of ours, and I know that if we reëlect him it will be an inspiration to Governor Glick when he receives the word that we still remember and cherish him as a member of this Board."

Governor Glick was reëlected by a unanimous rising vote.

Chas. E. Sutton, of Douglas county, was nominated by T. A. Hubbard to succeed Edwin Taylor, as member, Mr. Taylor declining to have his name presented. On motion, the rules were suspended and the secretary instructed to cast the unanimous vote of the Board for Mr. Sutton, which was done, and he was declared duly elected; and in like manner O. O. Wolf, of Franklin county, nominated by Geo. B. Ross; A. L. Sponsler, of Reno county, nominated by H. A. Rowland; J. C. Robison, of Butler county, nominated by O. O. Wolf, were elected to succeed themselves as members.

H. M. Laing, of Russell county, was nominated by C. A. Johnson to fill the unexpired term of one year caused by the election of I. L. Diesem to the presidency. On motion, the rules were suspended and the secretary instructed to cast the unanimous vote of the Board for Mr. Laing, who was declared duly elected as member for the ensuing year.

The committee on resolutions made the following report, which was adopted:

"RESOLVED, that we favor legislative appropriation for the establishment of state fairs in amount as the judgment of the legislature deems sufficient to do the work in a businesslike way and accommodate the people and diversified industries of this great commonwealth."

GREETING TO GOV. GLICK:

The good a man does never grows old—it is ever new and revitalized by generation succeeding generation. You may be afflicted by the decrepitudes of age as nature decrees, but those acts and doings of your life which meet your own approbation are to you as young and fresh as ever, and as they also are to your colleagues, fellows and compatriots. We so remember you at this Board meeting, and we note and regret your absence. Your wisdom, gained from a long and varied experience and observation, added largely to the value of our meetings. It is our fervent hope that you may be spared from pain that your mind may dwell upon the accumulated philosophies of mankind and be brightened by the sunshine of pleasant reflections upon a long and eventful life among a world of friends who heartily hope for your restoration to health.

WHEREAS, this Board has learned with profound sadness of the death of Frederick Wellhouse, who has been a faithful attendant upon the meetings of this Board for many years, and whose genial manners, lovable disposition and upright Christian character have been an inspiration to all who have come in contact with him. He was always profoundly interested in all phases of agricultural improvement and development. He was at one time the most renowned apple grower in the world. Horticulture being his special line, he did more to advance that great interest than any other man that ever lived within the borders of Kansas. Horticulturists and farmers, and, in fact, the whole people of Kansas, have sustained a great loss in the death of Father Wellhouse. We shall miss him from our meetings, but shall ever cherish his memory.

RESOLVED, that a copy of these resolutions be sent to his son and daughters who survive him, with the assurance that they have the profound sympathy of every member of the Kansas State Board of Agriculture.

WHEREAS, the Board of Agriculture, having learned with sorrow of the continued serious affliction of our former treasurer and most genial and affable associate, Edwin Snyder, we wish to record that we remember the many pleasant meetings that we have had with him and extend to him in his affliction our heart-felt sympathy and express the hope that he may be restored to health, that we may in the future enjoy the pleasure and privilege of again associating with him.

Messages of greetings and sympathy were also wired to Governor Glick by the officers of the Board.

An address, illustrated with charts, on "Maintenance of Soil Fertility," was delivered by Chas. E. Thorne, director of the Ohio Agricultural Experiment Station, Wooster.

Adjourned until 7:30 P. M.

FRIDAY EVENING SESSION.

The meeting was called to order, pursuant to adjournment, by Vice-president A. W. Smith, in Representative hall.

Miss Edna D. May, of the Department of Home Economics of the State University, read a paper entitled "While She Waits," and Rev. Frank L. Loveland, of the First Methodist Episcopal church, Topeka, delivered an address on "The Growing of a Human Plant."

Miss Hazelle Loveland, of Topeka, rendered a vocal solo, with Mrs. Robert D. Garver officiating at the piano.

Adjourned *sine die.*

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MEETING OF THE NEW BOARD.

JANUARY 13, 1911.

The new Board was called to order by President Diesem, at five P. M., immediately following the afternoon's program of the regular meeting, in Knights and Ladies of Security hall.

Roll-call; quorum present.

The oath of office was administered to the newly elected officers and members present by Assistant Secretary J. C. Mohler, notary.

On motion, reading of the minutes of the preceding meeting was dispensed with.

The appointive officers of 1910 were continued for the ensuing year.

Adjourned.

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PROCEEDINGS

OF THE FORTY-FIRST ANNUAL MEETING OF THE KANSAS STATE BOARD OF AGRICULTURE, HELD IN TOPEKA, JANUARY 10, 11, 12, 1912.

WEDNESDAY, January 10, 1912.

At four o'clock P. M. the meeting was called to order by President I. L. Diesem, in Representative hall, at the statehouse.

Secretary Coburn called the roll, and a quorum was found present, including the following officers and members: President I. L. Diesem, Vice-president A. W. Smith, Treasurer J. T. Tredway, Secretary F. D. Coburn, Chas. H. Sessions *(ex officio)* secretary of state, Chas. E. Sutton, O. O. Wolf, A. L. Sponsler, Thos. M. Potter, T. A. Hubbard, R. B. Ward, Geo. B. Ross, H. M. Laing, and J. C. Mohler, assistant secretary.

On motion, committees were named by the president as follows:

On credentials: J. T. Tredway, of Allen county; Geo. B. Ross, of Rice county; Ira D. Brougher, of Barton county; B. V. Wheeler, of Norton county, and Peter Pfeiffer, of Brown county.

On resolutions: A. L. Sponsler, of Reno county; E. E. Frizell, of Pawnee county; W. H. Smith, of Nemaha county; James Mains, of Jefferson county, and Geo. A. Blair, of Sumner county.

On program: Thos. M. Potter, of Marion county; J. L. Finley, of Ford county; B. W. Edwards, of Harper county; R. W. Wohler, of Lincoln county, and W. H. Miller, of Ness county.

The minutes of the preceding meeting were read by the secretary, and approved.

The committee on program recommended that the program as prepared and printed by the secretary be adopted as the official program of the meeting, which was done.

The committee on credentials made its report, which was adopted, showing the following-named as duly authorized delegates to the forty-first annual meeting of the Kansas State Board of Agriculture: Frank Bales, Allen county; G. H. Ford, Allen county; Ira D. Brougher, Barton county; Peter Pfeiffer, Brown county; Wm. Hilton, Butler county; James Iams, Clay county; Henry Lumb, Clay county; Fred W. Sturges, jr., Cloud county; Ivy Allen, Coffey county; R. D. Lake, Cowley county; J. D. Shepherd, Dickinson county; C. O. Bowman, Douglas county; J. F. Moore, Elk county; H. M. Knox, Finney county; J. L. Finley, Ford county; H. H. Greene, Franklin county; Forrest Luther, Gray county; C. H. Weiser, Greenwood county; L. G. Jennings, Harper county; B. W. Edwards, Harper county; James Mains, Jefferson county; C. A. Sparrow, Leavenworth county; R. W. Wohler, Lincoln county; C. A. Galt, Linn county; W. J. Young, McPherson county; Arthur Scholton, Mitchell county; H. M. Casebeer, Montgomery county; Geo. J. Pfister, Montgomery county; W. H. Smith, Nemaha county; W. W. Stanfield, Neosho county; W. H. Miller, Ness county; B. V. Wheeler, Norton county; J. E. Ewart, Ottawa county; E. E. Frizell, Pawnee county; J. A. Lister, Pottawatomie county; Walter Pedigo, Pratt county; H. S. Thompson, Reno county; D. C. Bowersox, Republic county; W. B. Craig, Riley county; Charles Riseley, Rooks county; C. H. Lyman, Rush county; F. J. Smith, Russell county; B. B. Stimmell, Saline county; Henry W. McAfee, Shawnee county; E. H. Lupton, Sheridan county; M. A. Diamond, Smith county; John Toland, Stafford county, and Geo. A. Blair, Sumner county.

Adjourned until 7:30 P. M.

WEDNESDAY EVENING SESSION.

President Diesem summoned the meeting to order, in Representative hall, at 7:30 P. M.

Prayer was offered by the Rev. Robert Gordon, of the First Baptist church, Topeka.

Governor W. R. Stubbs delivered an address of welcome on behalf of the state, and Representative Robert Stone one for Shawnee county and the city of Topeka, President Diesem responding.

Geo. P. Bellows, of Maryville, Mo., read a paper on "Farm Life Inducements for Young Men."

Adjourned until 9:30 A. M.

THURSDAY MORNING, JANUARY 11, 1912.

The meeting was called to order, in Representative hall, at 9:30 A. M., and prayer was offered by the Rev. J. W. Waldron, of the Kansas Avenue Methodist church, North Topeka.

The roll was called by the secretary.

Papers were read by O. E. Reed, of the State Agricultural College, Manhattan, on "Calf Raising," and W. S. Corsa, of White Hall, Ill., on "Opportunities in Live-stock Raising."

Adjourned until 1:30 P. M.

THURSDAY AFTERNOON SESSION.

The meeting convened pursuant to adjournment, President Diesem in the chair.

An address was delivered by A. Sykes, of Des Moines, Iowa, president of the Corn Belt Meat Producers' Association, on "The Value of Organization to the Farmers," and papers were read by Mrs. Ella S. Burton, of Topeka, state lecturer of the Farmers' Union, on "The Farmers' Union—Its Hopes and Plans," and by A. P. Reardon, of McLouth, lecturer of the State Grange, on the "Possibilities of the Grange as a Farmers' Organization."

Adjourned until 7:30 P. M.

THURSDAY EVENING SESSION.

The meeting convened, Vice-president A. W. Smith in the chair.

John Fields, editor of the *Oklahoma Farm Journal*, Oklahoma City, delivered an address on "Schools for Country Children," and Julia B. Perry, Superintendent Girls' Industrial School, Beloit, presented the subject of "The Industrial-school Girl—Does She Come from the Farm? Should She go There?"

E. W. Thompson, of Topeka, rendered several recitations in the patois of the French-Canadians.

Adjourned until 9:30 A. M.

FRIDAY MORNING, JANUARY 12, 1912.

The Board met at 9:30 A. M., in Representative hall, President Diesem in the chair.

Prayer was offered by the Rev. A. S. Henderson, of the First Congregational church, Topeka.

The roll was called by the secretary.

An address on "The Significance of 'Dry Farming'" was delivered by Alfred Atkinson, vice-president of the Dry Farming Congress, Bozeman, Mont.

Dr. G. Bohrer, of Lyons, introduced into the meeting a discussion of tree-planting for windbreaks, especially in western Kansas.

Adjourned until 1:30 P. M.

FRIDAY AFTERNOON SESSION.

The meeting convened in Representative hall, pursuant to adjournment, by call of President Diesem.

The secretary called the roll; quorum present.

Special memorial services were held in remembrance of G. W. Glick, and after various tributes the following preamble and resolution was unanimously adopted by a rising vote:

"WHEREAS, We note the absence of one who for nearly thirty years has been a constant and faithful attendant upon the meetings of this Board, and whose presence has always been a helpful inspiration to all,

"In the month of April, 1911, our beloved colleague and brother member, George W. Glick, departed this life and sailed out on that unknown sea whose billows never shadow a returning sail. We mourn his death, but we are proud of the splendid record of achievement that he has left for our inspiration and emulation.

"Governor Glick came to Kansas when a young man. His active and useful life spans the entire history of our state. His ability, integrity and sterling qualities of manhood soon attracted the attention of his neighbors, and he was put forward as a leader of public thought. Several times he has served his constituency with great ability in the state legislature; then he was called to the Chief Executive's chair of the state. In this he enjoyed the honorable distinction of being the only man of his political faith who was ever elected governor of Kansas. He filled many other offices of trust and honor, all with dignity and characterized by sterling integrity and ability; but his life's work of which he was proudest was his achievements in agriculture and stock raising. His beautiful Shannon Hill farm was a model in all its arrangements. The excellence of his Shorthorn herd of thoroughbred cattle was known and recognized through the entire nation.

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"*Therefore, Resolved,* that it is with profound sorrow that we part with one who as president and member of this Board has been so faithful, useful, kind and considerate to all with whom he came in contact. George W. Glick was the oldest and one of the most useful men ever connected with our Board. We shall miss his counsel and encouragement. We sincerely mourn his death, and we hope that our loss is his eternal gain.

"*Resolved,* that a copy of these resolutions be spread upon the minutes of this meeting, and also a copy be furnished to his family."

Tributes to the character and lovable nature of Governor Glick were given as follows:

CHAS. E. SUTTON: Governor Glick has stated in this room many times that of all the honors that have come to him during his long, useful life, his connection with this Board brought to him more pleasant hours than all the other offices combined. The governor in all the years that this Board has met never missed a meeting until the accident which practically brought his life to a close. His counsels were probably as much sought and as closely followed as those of any member of our Board. I think that the resolution just read should have, and I know will have, the endorsement of every man, woman and child that has come in contact with Governor Glick during these years, and I desire to second the resolution.

JAMES MAINS: Having been in attendance at these meetings for so many years, I can testify to the truthfulness and the deep feeling of those resolutions. I know that it is only in part the tribute that should be accorded Governor Glick. He was a man of the whole state, and there was nothing that was to the interest of the people but what he seemed to take a live interest in.

PETER PFEIFFER: I think I am one of the old fellows. I want to give Governor Glick credit. He got up in high office, but he recognized the common man. He showed the American principle, to put all men equal. He was not "stuck up," and he never slighted the common man.

A. P. REARDON: My first acquaintance with Mr. Glick was a good many years before this State Board of Agriculture. I noticed he was a man who took great interest in the welfare of the State Board of Agriculture. I have writen a few lines, as follows: "At this hour we are assembled to pay tribute to the memory of one who has stood shoulder to shoulder with the members of the State Board of Agriculture for many years in the important work of this honorable body. His counsel in its affairs showed the part of wisdom, and an earnestness and zeal for its best interests, which was ever an important characteristic of his actions. This day affords an opportunity to appreciate the true spirit of fraternity. George W. Glick had a long and continued membership with this Board, and the more extended these years the stronger the cord of fellowship, for real fraternity is not the growth of a year, but of many years, as is the history of our friend, as we listen to a recital of the virtues of the one whose memory we revere to-day."

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A. W. Smith: I would feel that I had not done my duty if I did not say a word in testimony of my appreciation of the friendship, integrity and character of Governor Glick. I do not recall the time when I first met him, first made his acquaintance. He was one of the noted characters of our state when I came here forty years ago. Governor Glick came to Kansas when it was still a territory, and as the resolution tries to say, his life work spans the entire history of Kansas. I do not recall now any man who has been more thoroughly identified with the development of the industries of our state than George W. Glick. My immediate and intimate acquaintance with him, however, was in 1898. He and I served on the Board of Managers for Kansas at the Omaha Exposition. It was there that I best learned his sterling qualities, his strict integrity, his courage upon all occassions to speak for that which he thought was right and to denounce that which he thought was wrong. Here in the meetings of this Board we all know the value of his services, of his judgment and advice. For nearly thirty years he has been present at all our meetings until the last one, when he was lying upon his death bed. I had expected, and intended in my heart, to attend his funeral services as a member of this Board, but, being called east to the death bed of my brother, I was out of the state at the time of Governor Glick's burial. So the last time I met him, I think, was in this Board's meeting. We shall all miss him. Our secretary will miss him. He was always ready, always willing to help in any way he thought best to advance the interests of the people of this commonwealth which he so much loved. He was a man of strict integrity, and I might add that I consider integrity as the greatest asset that any man can have. George W. Glick had it in an eminent degree. No one ever accused him of any false motives or of ever advocating anything for the sake of popularity. He advocated everything that he did advocate from the standpoint of principle, the standpoint of right, as he viewed it. For him I shall always have great admiration. His departure is a loss, I might say an irreparable loss, to the State Board of Agriculture, and in losing him from this Board the state sustains a great loss.

Thos. M. Potter: I feel as if at this time silence and reflection and recollection of the life of that noble man would speak more eloquently than any words of mine. Humble and modest to a fault, considerate of the interests of all, and especially the humble, I know of no man for whose sterling worth and character I have higher respect. I remember well at one time when our newspapers and some of our people were criticising and even vilifying some of the leading men in the state, but Governor Glick greatly deplored that such calumny should be heaped upon men in such positions, although many of his views were quite the opposite of theirs. I mention this simply as characteristic of the man. At another time he said to me, "What a shame," or words to that effect, "that up at our Agricultural College those who are not able to attend the whole course and were attending the short course should have that fact thrown into their faces!" I think perhaps he felt the condition even more keenly than he should. Governor Glick probably had more to do with stopping the aspersions upon those who could go there and only utilize the two or three

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weeks of that short course than any other man in this state, and I have never heard those aspersions since. Pure in character, wise in judgment, conciliatory in all his feelings and aspirations, a despiser of pretense, he would not even house his fine live stock and pamper it as most stockmen do, because he knew it would destroy their hardiness. He wanted to raise animals that would be of use when they went out of his possession. He produced some of the most valuable Shorthorns ever in the state of Kansas. Characteristic of the man! We have lost a wise counselor, a man of clear judgment, whose interest in this organization and interest in the state are seldom equaled. Who can value such a character in laying the foundation of a great state and in placing upon it the superstructure? I repeat, his deeds speak more emphatically than anything I can utter here.

I. L. **DIESEM**: I desire at this time to express my own sorrow at the passing away of a grand man, in the fullness of years and honors. He was a true and tried friend, and a close association of some twenty years with him in the work of this Board only taught me more and more, as the years rolled away, the value of his friendship and his grandeur of character. A man of broad mind, whose greatest desire was to see Kansas grow and prosper, and whose best thoughts were always for the farmers of this state. The world is better for his having lived.

Tennyson's "Crossing the Bar" expresses it all in beautiful language:

> Sunset and evening star,
>   And one clear call for me;
> And may there be no moaning of the bar,
>   When I put out to sea.
>
> But such a tide as moving seems asleep,
>   Too full for sound or foam,
> When that which drew from out the boundless deep
>   Turns again home.
>
> Twilight and evening bell,
>   And after that the dark!
> And may there be no sadness of farewell
>   When I embark;
>
> For tho' from out our bourne of Time and Place
>   The flood may bear me far,
> I hope to see my Pilot face to face,
>   When I have crossed the bar.

President Diesem read, as the expression of Secretary Coburn, the following:

"I was for a third of a century such an admirer of Governor Glick and under so many and great obligations to him for kindnesses during those years that it is impossible for me to give voice in public to the gratitude and affection I bore him. Holding views upon various subjects entirely different from his own, we nevertheless were the closest of friends, and my sorrow at his going hence, which meant our parting at least for a time, is greater than I can express. It would be entirely truthful to say that had it not been for Governor Glick I would not be now, and would not have been for all these years, the secretary of this world-famous Board of Agriculture, that has honored me so much. He knew full well in his lifetime that I knew this.

"Having said this of the dead I might say as much to another, Thomas A. Hubbard, which I am glad to do while I can yet look into his kindly eyes and while his ears may hear that this will be my testimony. It has been no inconsiderable part of the good fortune which has come to me that I knew these men. I did not merely like Governor Glick; I loved him. He is gone. I love Mr. Hubbard; he is still here, which is a happiness to us all. This is not less true of these several other gentlemen of our Board, association with whom has been a distinguished honor, an unusual pleasure and an uplifting inspiration.

"So long as I have an identity with the Board of Agriculture I shall retain a sense of loneliness in the absence from its meetings of the one who has gone to the great beyond, and the one whose presence always illumines these gatherings and with that of his colleagues makes them among the important and uplifting events of a lifetime."

In the election of officers and members, A. W. Smith nominated I. L. Diesem, of Finney county, to succeed himself as president for the ensuing year, and, on motion, the rules were suspended and the secretary instructed to cast the unanimous vote of the Board for Mr. Diesem, which was done, and he was declared duly elected president.

A. W. Smith, nominated for vice president by James Mains, was in the same manner reëlected to that position, and likewise J. T. Tredway was reelected treasurer, after having been nominated by Peter Pfeiffer.

Thos. M. Potter nominated F. D. Coburn for secretary of the Board. The nomination was seconded by A. W. Smith, and by a unanimous rising vote Mr. Coburn was reëlected to the office of secretary for the ensuing term of two years.

In response to a call for a speech Mr. Coburn said: "Gentlemen of the Board of Agriculture: I would certainly be unjust to myself if I did not take advantage of such an opportunity to say that I appreciate, as highly as any human being possibly can, the honors that you in your generosity have thrust upon me during all these years. I haven't any new promises to make, and I can only account for what you have done here again by the facts that I have never put myself on your program and that you have never been compelled to listen to any of my speeches; I do not want to break the charm to-day. I thank you."

J. L. Finley nominated Thos. M. Potter, of Marion county, as a member to succeed himself; on motion, the rules were suspended and the secretary instructed to cast the unanimous vote of the meeting for Mr. Potter, who was declared elected; and in like manner T. A. Hubbard, nominated by O. O. Wolf; R. B. Ward, nominated by James Iams; Geo. B. Ross, nominated by James Mains, and H. M. Laing, nominated by Chas. E. Sutton, were reëlected to succeed themselves as members.

Thos. M. Potter nominated James N. Fike, of Thomas county, as a member to fill the year of the unexpired term of G. W. Glick, deceased. The rules were suspended and Mr. Fike was unanimously elected.

Richard R. Price, of the University of Kansas, Lawrence, read a paper on "The School as a Social and Civic Center."

Query-box questions were answered.

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The committee on resolutions made the following report, which was adopted:

"*Resolved*, that we endorse the progressive policy of the legislature and the Agricultural College in providing for and carrying on agricultural demonstrational work in the western counties of the state, and believe in its further extension.

"*Resolved*, that we favor agricultural and live-stock fairs as most admirable educational means for the welfare of the industrial growth of Kansas, and favor their promotion in state and county.

"*Resolved*, that we believe in the justice of equal suffrage and commend it to the voters of the state."

Treasurer Tredway reported $1.98 in the Board's treasury, and the report was adopted as correct.

Adjourned until 7:30 P. M.

FRIDAY EVENING SESSION.

The meeting convened pursuant to adjournment, by call of President Diesem.

An address was made by Frank K. Sanders, president of Washburn College, Topeka, on "Education as an Investment," and Mrs. May Ewing Scott, of Iola, described "Some Glimpses of Tropical America."

Following each of the speakers at the evening session, Miss Nanon L. Herren delighted the audience with her clever readings.

A vote of thanks was unanimously tendered the various speakers on the program, and for the entertainment afforded by the readings of Miss Herren and Mr. Thompson.

Adjourned *sine die*.

MEETING OF THE NEW BOARD.

JANUARY 12, 1912.

The new Board was called to order in the secretary's office, at five P. M., by President Diesem. Those present were President Diesem, Vice President A. W. Smith, Treasurer J. T. Tredway, Secretary F. D. Coburn, Chas. E. Sutton, O. O. Wolf, A. L. Sponsler, Thos. M Potter, T. A. Hubbard, R. B. Ward, Geo. B. Ross, and H. M. Laing.

The oath of office was administered to the newly elected officers and members present by Assistant Secretary J. C. Mohler, notary.

On motion, reading the minutes of the preceding meeting was dispensed with.

The appointive officers of 1911 were continued for the ensuing year.

Adjourned.

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Part V.

General Statistics.

1911—1912.

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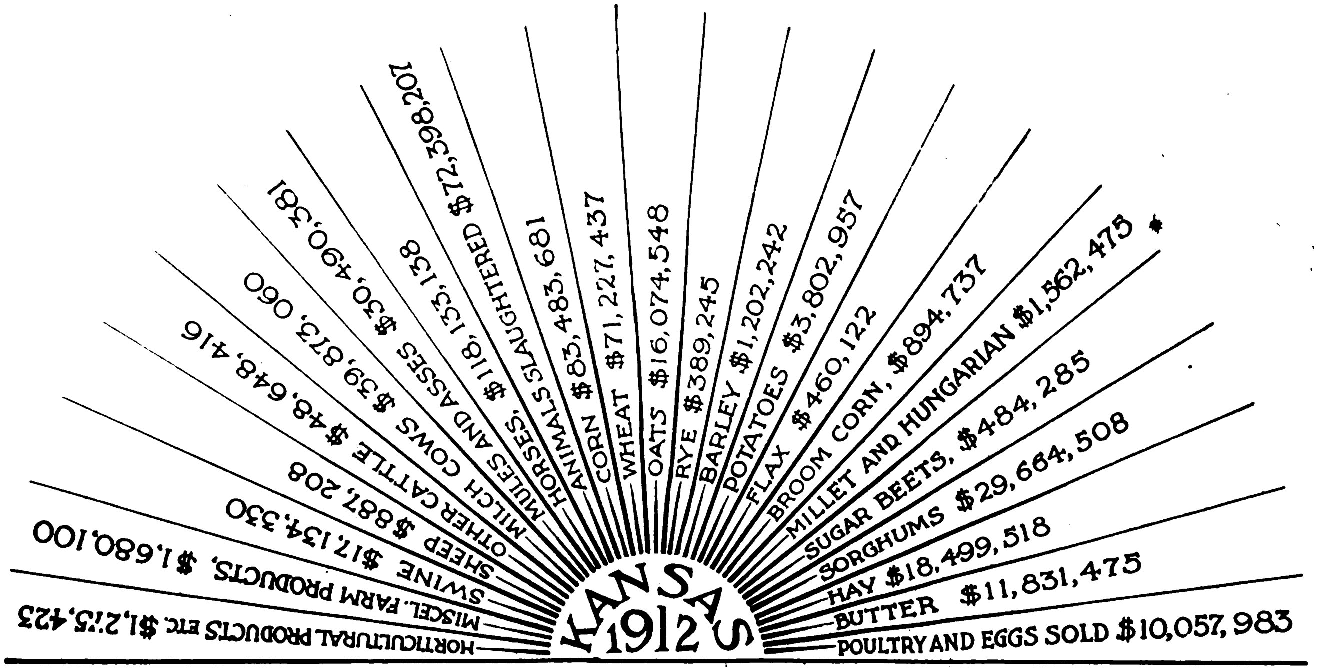

TOTAL VALUE OF FARM PRODUCTS AND LIVESTOCK $580,155,476

A SUNRISE OUT IN KANSAS.

POPULATION, ACREAGE, PRODUCTION, ASSESSED VALUATION, ETC.

ALLEN COUNTY.

Organized in 1855; area, 504 square miles; population, 24,794; rank in population, 17; assessed valuation, $29,924,297; miles of railroad, main track, 99.41; county seat, Iola, population, 8037.

POPULATION AND VALUATION.—ALLEN COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad. etc.	Total.
The county		26,127		24,794	$11,531,835	$5,220,530	$5,871,785	$7,300,147	$29,924,297
Carlyle	115	709	88	681	$819,565	$39,810	$194,210	$598,965	$1,652,550
Carlyle tp	594		593						
Cottage Grove tp		792		791	602,390	....	189,350	468,455	1,255,195
Deer Creek tp		439		473	610,085	....	127,810	11,860	749,705
Gas	988	4,078	944	3,762	....	208,220	57,275	63,165	328,660
La Harpe	1,717		1,528		....	397,385	269,390	72,745	789,520
Elm tp	1,373		1,290		1,400,570	80,285	490,615	546,370	2,517,840
Elsmore	204	1,574	233	1,609	....	67,975	77,880	26,300	172,155
Savonburg	254		218		....	95,865	107,230	25,425	228,520
Elsmore tp	1,116		1,158		1,062,260	....	244,300	311,715	1,618,275
Geneva tp		537		514	524,660	14,175	151,400	316,460	1,006,695
Humboldt	2,795	3,370	2,259	2,789	....	926,080	608,500	104,120	1,638,700
Humboldt tp	575		530		1,502,590	11,745	225,760	956,275	2,696,370
Bassett	409	10,457	396	10,051	....	92,365	18,325	10,365	121,055
Iola	8,324		8,037		....	2,951,305	1,606,665	246,580	4,804,550
Iola tp	1,724		1,618		1,704,820	94,450	532,900	1,121,535	3,453,705
Petrolia	137	585	163	630	463,445	29,555	172,480	1,373,917	2,039,397
Logan tp	448		467						
Moran	564	1,512	641	1,544	....	146,425	107,200	53,275	306,900
Marmaton tp	948		903		1,018,360	1,155	258,825	650,780	1,929,120
Mildred	359	1,306	244	1,153	1,039,565	63,735	244,030	300,000	1,647,330
Osage tp	947		909						
Salem		768		797	783,575	....	188,140	46,340	1,018,055

FARM AND CROP STATISTICS.—ALLEN COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	3,653	62,101	$52,164.84	6,041	84,574	$78,579.38
Spring wheat.......bu.	....	....	....	....	....	....
Corn.......bu.	70,984	1,348,696	728,295.84	70,751	1,273,518	725,905.26
Oats.......bu.	19,152	229,824	91,929.60	7,209	187,434	74,973.60
Rye.......bu.	189	2,835	2,268.00	366	5,490	4,117.50
Barley.......bu.	1	16	8.00	2	40	18.00
Emmer ("speltz")..bu.	81	1,296	583.20	....	....	....
Buckwheat.......bu.	15	120	120.00	....	....	....

FARM AND CROP STATISTICS.—ALLEN COUNTY.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Irish potatoes........bu.	918	23,738	$23,738.00	718	49,542	$36,165.66
Sweet potatoes......bu.	7	350	437.50	11	759	759.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	11,910	41,685	75,033.00	6,051	36,306	54,459.00
Tobacco............lbs.	10	9,000	900 00	11	8,800	880.00
Broom-corn.........lbs.	1,096	657,000	42,705.00	2,049	1,178,175	47,127.00
Millet & hungarian, tons	728	1,092	6,552.00	826	1,445	7,225.00
Sugar-beets.......tons	1	6	30.00	....	....	....
Sorghum for—						
syrup or sugar...gals.	116	8,120	3,897.60	684	60,192	27,086.40
forage or grain..tons	1,011	....	8,088.00	2,917	....	29,170.00
Milo maize.........tons	45	158	869.00	101	303	1,515.00
Kafir-corn.........tons	13,160	52,640	263,200 00	25,654	89,789	404,050.50
Jerusalem corn....tons	10	40	200.00	....	....	....
Timothy...........tons	13,425	* 12,136	145,632.00	6,677	† 5,604	56,040.00
Clover............tons	4,258			2,998		
Blue-grass........tons	2,560			1,278		
Alfalfa...........tons	768			1,388		
Orchard-grass.....tons	25			39		
Other tame grasses, tons	1,044			341		
Prairie-grass fnc'd, tons	96,069	24,166	216,954.00	93,805	23,311	186,488.00
Totals.............	241,245	....	$1,663,605.58	229,912	....	$1,729,559.30

Corn on hand March 1, 1911, 245,134 bushels; March 1, 1912, 233,048 bushels.
Wheat on hand March 1, 1911, 4720 bushels; March 1, 1912, 3575 bushels.

*** Product of 1910. † Product of 1911.**

SUMMARY.—ALLEN COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops.........................acres	241,245	$1,663,605.58	229,912	$1,729,559.30
Animals slaughtered and sold for slaughter....	....	474,470.00	....	374,854.00
Poultry and eggs sold....................	....	133,880.00	....	124,447.00
Wool clip..........................lbs.	8,248	1,401.31	8,749	1,749.80
Cheese.............................lbs.	70	9.10	....	....
Butter.............................lbs.	485,438	125,505.12	466,928	123,522.00
Milk sold............................	....	38,590.00	....	42,589.00
Honey and beeswax..................lbs.	3,742	562.90	1,154	178.70
Wood marketed........................	....	794.00	....	2,996.00
Totals...............................	....	$2,438,818.01	....	$2,399,845.80

LIVE STOCK.—ALLEN COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses....................	9,657	$1,091,241.00	9,802	$1,107,626.00	341	281
Mules and asses............	2,001	262,131.00	2,171	284,401.00	27	16
Milch cows.................	7,241	289,640.00	7,934	357,090.00	197	140
Other cattle...............	9,559	258,093.00	9,303	297,696.00	220	223
Sheep......................	2,301	9,664.20	2,279	9,685.75	38	77
Swine......................	19,384	193,840.00	18,538	185,380.00	1,321	1,652
Totals................	50,143	$2,104,609.20	50,027	$2,241,818.75	2,144	2,389

Number of dogs in county March 1, 1911, 1774; March 1, 1912, 1749.
Number of sheep killed by dogs, year ending March 1, 1911, 23; March 1, 1912, 50.
Number of sheep killed by wolves, year ending March 1, 1911, 4; March 1, 1912, 34.

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ANDERSON COUNTY.

Organized in 1855; area, 576 square miles; population, 12,938; rank in population, 51; assessed valuation, $23,610,687; miles of railroad, main track, 130.54; county seat, Garnett, population, 2238.

POPULATION AND VALUATION.—ANDERSON COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total
The county.......		12,714		12,938	$11,017,900	$1,908,910	$3,859,050	$6,824,827	$23,610,687
Indian Creek tp...		545		524	$808,665	$5,040	$138,160	$220,876	$1,172,741
Jackson tp........		821		782	765,800	42,980	177,795	304,422	1,290,997
Lincoln tp........		761		713	846,715	18,395	128,375	212,605	1,206,090
Lone Elm tp......		706		744	982,105	21,900	239,565	158,962	1,402,532
Garnett..........	1,962	2,606	2,238	2,909	....	1,133,480	738,875	165,959	2,038,314
Monroe tp........	644		671		710,020	....	130,470	908,363	1,748,853
Colony...........	512	989	463	1,022	....	169,795	147,800	29,291	356,886
Ozark tp..........	477		559		668,000	....	127,740	854,431	1,650,171
Putnam tp........		656		633	735,085	....	147,625	710,635	1,593,345
Amiot............	38	1,080	45	1,064	1,371,080	39,085	418,935	237,168	2,066,268
Harris...........	162		153						
Reeder tp.........	880		866						
Kincaid..........	393	1,008	357	1,059	....	106,215	135,700	44,226	286,141
Rich tp...........	615		702		1,020,590	6,055	276,510	721,179	2,024,334
Union tp.........		494		476	502,820	....	97,160	716	600,696
Greeley..........	516	780	477	769	....	164,790	120,250	20,902	305,942
Walker tp........	264		292		295,485	....	80,190	362,341	738,016
Mont Ida..........	*	551	133	628	513,035	35,385	161,205	849,752	1,559,377
Washington tp....	551		495						
Welda tp..........		699		658	801,520	41,515	209,855	638,535	1,691,425
Westphalia.......	325	1,018	296	957	996,980	124,275	382,840	374,464	1,878,559
Westphalia tp.....	693		661						

* Not reported separately from township in 1911.

FARM AND CROP STATISTICS.—ANDERSON COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	3,746	67,428	$55,965.24	6,429	102,864	$90,520.32
Spring wheat.......bu.	....	....	....	....	....	....
Corn...............bu.	71,400	1,142,400	708.288.00	76,288	1,449,472	797,209.60
Oats...............bu.	19,920	219,120	92,030.40	5,478	186,252	74,500.80
Rye................bu.	171	2,736	2,188.80	263	3,945	2,958.75
Barley.............bu.	10	160	80.00	....	......	....
Emmer ("speltz")..bu.	36	540	259.20	30	600	270.00
Buckwheat..........bu.	1	7	7.00	148	2,072	2,072.00
Irish potatoes.......bu.	574	14,350	14,637.00	536	48,240	37,144.80
Sweet potatoes......bu.	5	300	375.00	5	490	490.00
Castor-beans........bu.	85	680	850.00	....	....	....
Cotton..............lbs.	....	....	....	....	....	....
Flax................bu.	6,425	25,700	44,975.00	3,034	22,755	34,132.50
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	4	2,000	130.00	7	3,500	140.00
Millet & hungarian, tons	305	610	3,660.00	410	820	4,100.00
Sugar-beets.......tons	1	5	25.00	3	24	120.00
Sorghum for—						
syrup or sugar...gals.	281	16,298	8,149.00	297	22,275	11,187.50
forage or grain..tons	1,107	....	9,963.00	2,825	....	28,250 00
Milo maize........tons	144	432	2,592 00	58	174	783.00
Kafir-corn........tons	6,953	27,812	139,060 00	15,964	55,874	223,496 00
Jerusalem corn....tons	48	172	860.00	6	21	84.00
Timothy..........tons	15,819	* 19,026	209,286.00	10,415	† 8,326	83,260.00
Clover...........tons	7,667			5,581		
Blue-grass........tons	2,707			3.077		
Alfalfa...........tons	1,416			1,910		
Orchard-grass.....tons	12			4		
Other tame grasses, tons	3,350			850		
Prairie-grass fnc'd, tons	126,138	26,253	210,024.00	126,835	17,321	129,907.50
Totals.............	268.320	....	$1.503,404 64	260,453	....	$1,520,576.77

Corn on hand March 1, 1911, 252,688 bushels; March 1, 1912, 129,275 bushels.
Wheat on hand March 1, 1911, 2012 bushels; March 1, 1912, 1463 bushels.
*** Product of 1910. † Product of 1911.**

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SUMMARY.—ANDERSON COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops ... acres	268,320	$1,503,404.64	260,453	$1,520,576.77
Animals slaughtered and sold for slaughter		782 147.00		726,112.00
Poultry and eggs sold		131,391.00		133,177.00
Wool clip ... lbs.	4,107	698.19	5,071	1,014.20
Cheese ... lbs.			100	14.00
Butter ... lbs.	266,119	68,466.12	234,275	60,488.75
Milk sold		82,780.00		78,934.00
Honey and beeswax ... lbs.	2,467	370.55	1,968	295.70
Wood marketed		729.00		868.00
Totals		$2,569,986.50		$2,521,480.42

LIVE STOCK.—ANDERSON COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	9,933	$1,122,429.00	10,095	$1,140,735.00	256	222
Mules and asses	2,185	286,235.00	2,277	298,287.00	17	16
Milch cows	8,616	344,640.00	9,284	417,780.00	143	142
Other cattle	15,612	421,524.00	13,800	441,600.00	231	166
Sheep	3,332	13,994.40	1,919	8,155.75	66	51
Swine	25,306	253,060.00	22,717	227,170.00	829	2,376
Totals	64,984	$2,441,882.40	60,092	$2,533,727.75	1,542	2,973

Number of dogs in county March 1, 1911, 1860; March 1, 1912, 2042.
Number of sheep killed by dogs, year ending March 1, 1912, 19.
Number of sheep killed by wolves, year ending March 1, 1911, 21; March 1, 1912, 1.

ATCHISON COUNTY.

Organized in 1855; area, 423 square miles; population, 30,081; rank in population, 11; assessed valuation, $40,538,446; miles of railroad, main track, 90.35; county seat, Atchison, population, 16,429.

POPULATION AND VALUATION.—ATCHISON COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.			Assessed valuation of property.				
	1911.		1912 †	Land.	City lots.	Personal.	Railroad. etc.	Total.
The county		30,081		$16,159,557	$7,946,489	$11,678,621	$4,753,779	$40,538,446
Effingham	693	1,989			$268,470	$249,310	$24,703	$542,483
Benton tp.	1,296			$2,397,434	1,600	281,790	220,622	2,901,446
Center tp.		1,290		2,084,473	36,802	386,840	571,203	3,079,318
Muscotah	440	1,885			134,410	166,130	24,419	324,959
Grasshopper tp.	1,445			2,363,062		396,670	213,781	2,973,513
Kapioma tp.		1,171		1,634,331	21,497	241,280	146,149	2,043,257
Lancaster	201	1,931			45,970	79,530	17,180	142,680
Huron	190				43,240	61,270	26,929	131,439
Lancaster tp.	1,540			2,723,330	2,480	434,350	389,035	3,549,195
Mt. Pleasant tp.		1,224		1,670,935	58,650	502,220	766,478	2,998,283
Shannon tp.		3,067		2,373,631	68,340	655,700	762,991	3,860,662
Walnut tp.		1,095		912,361	42,500	122,490	815,847	1,893,198
Atchison		*16,429			7,222,530	8,101,041	774,442	16,098,013

*** Federal census 1910.**
† No enumeration made in 1912.

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FARM AND CROP STATISTICS.—ATCHISON COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	37,216	669,888	$589,501.44	44,680	938,280	$797,538.00
Spring wheat.......bu.	276	2,568	2,144.40	9	180	144.00
Corn...............bu.	86,696	1,994,008	1,096,704.40	60,479	2,177,244	1,219,256 64
Oats...............bu.	28,753	575,060	218,522.80	16,767	570,078	210,928.86
Rye................bu.	117	2,106	1,790.10	512	10,240	7,168.00
Barley.............bu.	126	2,520	1,260.00	60	1,680	756.00
Emmer ("speltz")..bu.	19	475	213.75	....	....	....
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	1,722	48,216	46,287.36	901	74,783	46,365.46
Sweet potatoes......bu.	44	3,300	3,630.00	45	3,870	3,483.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	2	600	60.00
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	....	....	....	....	....	....
Millet & hungarian, tons	521	1,042	7,294.00	822	1,644	9,453.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	103	10,300	5,150 00	34	3,400	1,700.00
forage or grain..tons	242	....	3,146.00	689	....	9,646.00
Milo maize........tons	7	25	138.00	17	51	255.00
Kafir-corn........tons	239	956	4,780.00	492	1,722	8,610.00
Jerusalem corn....tons	16	64	320.00	15	52	260.00
Timothy..........tons	11,295	* 20,527	246,324.00	10,061	† 11,927	137,160.50
Clover...........tons	5,965			3,904		
Blue-grass........tons	14,132			16,358		
Alfalfa...........tons	2,355			2,974		
Orchard-grass.....tons	67			27		
Other tame grasses, tons	1,192			1,615		
Prairie-grass fnc'd, tons	38,449	3,228	32,280.00	45,478	2,281	20,529.00
Totals.............	229,552	....	$2,259,486.25	205,941	....	$2,473,313.46

Corn on hand March 1, 1911, 695,251 bushels; March 1, 1912, 362,865 bushels.
Wheat on hand March 1, 1911, 42,675 bushels; March 1, 1912, 84,090 bushels.
*** Product of 1910. † Product of 1911.**

SUMMARY.—ATCHISON COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops............................acres	**229,552**	**$2,259,486.25**	**205,941**	**$2,473,313.46**
Animals slaughtered and sold for slaughter....	....	**584,372.00**	....	**658,698.00**
Poultry and eggs sold........................	....	**98,569.00**	....	**155,922.00**
Wool clip.............................lbs.	**3,846**	**653.82**	**1,830**	**366.00**
Cheese.................................lbs.	....	....	**956**	**133.84**
Butter.................................lbs.	**730,412**	**206,844.00**	**697,433**	**194,358.25**
Milk sold...................................	....	**81,824.00**	....	**72,108.00**
Honey and beeswax......................lbs.	**13,382**	**2,082.30**	**6,099**	**1,056.85**
Wood marketed...............................	....	**1,921.00**	....	**2,222.00**
Totals...................................	....	**$3,235,752.37**	....	**$3,558,178.40**

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LIVE STOCK.—ATCHISON COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	8,008	$904,904.00	7,787	$879,931.00	217	320
Mules and asses	2,363	309,553.00	2,355	308,505.00	30	29
Milch cows	7,387	295,480.00	7,668	345,060.00	106	108
Other cattle	8,229	222,183.00	6,553	209,696 00	129	132
Sheep	3,832	16.094.40	1,111	4,721 75	185	19
Swine	21,354	213,540.00	16,194	161,940.00	863	7,999
Totals	51,173	$1.961.754.40	41,668	$1.909.853 75	1,580	8.607

Number of dogs in county March 1, 1911, 2131; March 1, 1912, 1887.
Number of sheep killed by dogs, year ending March 1, 1911, 35; March 1, 1912, 35.
Number of sheep killed by wolves, year ending March 1, 1911, 22; March 1, 1912, 68.

BARBER COUNTY.

Organized in 1873; area, 1134 square miles; population, 9746; rank in population, 69; assessed valuation, $19,249,575; miles of railroad, main track, 100.65; county seat, Medicine Lodge, population, 1330.

POPULATION AND VALUATION.—BARBER COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county		9,915		9,746	$9,572,050	$1,470,345	$4,365,230	$3,841,950	$19,249,575
Ætna tp		141		127	$431,260	$2,750	$153,880	....	$587,890
Cedar tp		378		338	523,020	....	127,210	$76,159	726,389
Deerhead tp		131		115	228,360	....	52,470	....	280,830
Eagle tp		280		268	456,590	....	197,330	1,820	655,740
Elm Mills tp		277		285	421,970	....	123,160	2,169	547,299
Hardtner	*....	517	219	561	....	56,775	111,180	91	168,046
Elwood tp	517		342		707,760	....	242,350	22,172	972,282
Hazelton	313	656	342	696	....	91,920	118,270	67,455	277,645
Hazelton tp	343		354		655,870	....	144,700	422,944	1,223,514
Kiowa	1,557	1,863	1,455	1,804	....	560,715	447,880	128,497	1,137,092
Kiowa tp	306		349		722,400	....	149,920	468,285	1,340,605
Lake City tp		333		304	261,690	36,020	234,370	283,354	815,434
McAdoo tp		126		135	291,620	....	85,550	565	377,735
Medicine Lodge	1,386	2,259	1,330	2,136	....	498,930	491,500	115,041	1,105,471
Medicine Lodge tp	873		806		1,351,120	....	410,830	564,446	2,326,396
Mingona tp		318		336	395,200	....	129,410	289,142	813,752
Moore tp		362		344	549,800	....	185,290	229,844	964,934
Nippawalla tp		301		279	512,300	9,320	184,350	287,532	993,502
Sharon	302	976	347	1,018	....	122,150	135,420	25,836	283,406
Sharon tp	674		671		997,710	....	176,480	193,052	1,367,242
Sun City tp		213		263	247,430	19,395	143,640	194,795	605,260
Turkey Creek tp		218		174	283,050	....	86,860	245,514	615,424
Isabel	219	566	227	563	....	72,370	130,190	25,235	227,795
Valley tp	347		336		534,900	....	102,990	198,002	835,892

* Not reported separately from township in 1911.

FARM AND CROP STATISTICS.—BARBER COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	17,566	175,660	$149,311.00	71,560	1,073,400	$869,454.00
Spring wheat.......bu.	....	....	....	....	....	....
Corn...............bu.	111,342	1,558,788	872,921.28	58,312	1,049,616	514,311.84
Oats...............bu.	22,889	457,780	164,800.80	11,243	269,832	107,232.80
Rye................bu.	84	504	403.20	359	4,667	3,313.57
Barley.............bu.	93	1,209	604.50	142	2,982	1,341.90
Emmer ("speltz")..bu.	....	....	....	....	....	....
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	237	4,740	4,977.00	193	17,370	14,243.40
Sweet potatoes......bu.	10	500	625.00	16	1,360	1,360.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	....	....	....	52	26,000	910.00
Millet & hungarian, tons	424	848	5,088.00	637	1,911	9,555.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	43	2,580	1,290.00	7	490	245.00
forage or grain..tons	7,328	....	58,624.00	4,944	....	49,440.00
Milo maize........tons	669	2,007	12,042.00	444	1,332	6,660.00
Kafir-corn........tons	21,071	73,749	368,745.00	28,369	99,291	446,809.50
Jerusalem corn....tons	8	28	140.00	....	....	....
Timothy..........tons	....	* 12,543	112,887.00	....	† 15,513	147,373.50
Clover............tons	....			....		
Blue-grass........tons	....			....		
Alfalfa...........tons	12,596			12,496		
Orchard-grass.....tons	....			....		
Other tame grasses, tons	....			20		
Prairie-grass fnc'd, tons	301,832	1,041	7,287.00	283,511	1,646	13,168.00
Totals............	496,192	....	$1,759,745.78	472,305	....	$2,186,118.51

Corn on hand March 1, 1911, 107.518 bushels; March 1, 1912, 133,244 bushels.
Wheat on hand March 1, 1911, 86,577 bushels; March 1, 1912, 11.910 bushels.

*** Product of 1910. † Product of 1911.**

SUMMARY.—BARBER COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops..........................acres	496,192	$1,759,745.78	472,305	$2,186,118.51
Animals slaughtered and sold for slaughter....	....	707,583.00	....	593,790.00
Poultry and eggs sold......................	....	47,126.00	....	52,401.00
Wool clip...........................lbs.	6,442	1,095.14	21,950	4,390 00
Cheese..............................lbs.	35	4.55	140	19 60
Butter..............................lbs.	137,503	33,000.72	141,592	35,398.00
Milk sold................................	....	11,926.00	....	18,279.00
Honey and beeswax...................lbs.	3,720	558.00	2,718	407.70
Wood marketed............................	....	250.00	....	320.00
Totals..................................	....	$2.561.289.19	....	$2,891,123.81

LIVE STOCK.—BARBER COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	10,645	$1,202,885.00	10,391	$1,174,183.00	186	540
Mules and asses	2,989	391,559.00	3,142	411,602.00	18	24
Milch cows	12,179	487,160.00	13,429	604,305.00	64	114
Other cattle	30,362	819,774.00	29,131	932,192.00	242	970
Sheep	5,347	22,457.40	3,926	16,685.50	45	190
Swine	16,758	167,580.00	14,899	148,990.00	5,322	6,712
Totals	78,280	$3,091,415.40	74,918	$3,287,957.50	5,877	8,550

Number of dogs in county March 1, 1911, 1405; March 1, 1912, 1359.
Number of sheep killed by wolves, year ending March 1, 1912, 12.

BARTON COUNTY.

Organized in 1872; area, 900 square miles; population, 19,003; rank in population, 32; assessed valuation, $42,348,776; miles of railroad, main track, 93.80; county seat, Great Bend, population, 5000.

POPULATION AND VALUATION.—BARTON COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county	19,486	19,003	$25,274,700	$5,053,950	$7,876,940	$4,143,186	$42,348,776
Albion tp	341	318	$1,006,150	....	$163,750	$114,883	$1,284,783
Beaver tp	348	318	1,041,700	....	159,720	1,700	1,203,120
Buffalo tp	497	467	1,209,980	$22,210	295,150	228,108	1,755,448
Cheyenne tp	718	710	1,375,700	13,820	203,040	266,342	1,858,902
Clarence tp	377	374	1,108,500	....	267,840	1,063	1,377,403
Cleveland tp	321	305	904,200	....	127,180	2,051	1,033,431
Comanche tp	660	688	1,593,520	....	335,600	....	1,929,120
Eureka tp	287	302	1,100,100	....	168,640	178,200	1,446,940
Fairview tp	379	381	988,300	10,960	156,330	294	1,155,884
Grant tp	348	341	977,500	....	113,210	122,110	1,212,820
Great Bend	5,500 } 5,990	5,000 } 5,435	....	2,677,690	1,754,160	184,151	4,616,001
Great Bend tp	490	435	1,393,600	7,760	331,740	535,672	2,268,772
Hoisington	2,624 } 3,240	2,600 } 3,299	....	1,005,160	567,950	99,977	1,673,087
Homestead tp	616	699	1,847,100	56,270	256,480	600,841	2,760,641
Claflin	561 } 893	603 } 954	....	292,560	324,930	28,642	646,132
Independent tp	332	351	1,190,300	....	191,450	71,347	1,453,097
Ellinwood	892 } 1,523	1,016 } 1,649	....	698,770	628,340	91,677	1,418,787
Lakin tp	631	633	2,151,150	....	336,870	634,349	3,122,369
Liberty tp	402	387	984,450	9,670	199,890	307,133	1,501,143
Logan tp	377	370	1,190,700	....	174,670	153,448	1,518,818
Pawnee Rock	469 } 869	444 } 800	....	191,450	205,950	36,240	433,640
Pawnee Rock tp	400	356	1,076,900	....	136,480	152,499	1,365,879
South Bend tp	421	422	1,137,300	....	183,590	2,226	1,323,116
Union tp	362	347	983,900	....	125,470	....	1,109,370
Walnut tp	635	693	1,051,550	67,630	342,470	330,233	1,791,883
Wheatland tp	448	443	962,100	....	126,090	....	1,088,190

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FARM AND CROP STATISTICS.—BARTON COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat........bu.	210,014	2,310,154	$2,056,037.06	224,658	2,471,238	$2,001,702.78
Spring wheat........bu.	....	....	....	....	....	....
Corn................bu.	79,763	957,156	545,578.92	71,077	1,421,540	767,631.60
Oats................bu.	21,306	447,426	183,444.66	19,907	617,117	253,017.97
Rye.................bu.	130	1,430	1,144.00	179	2,506	1,754 20
Barley..............bu.	2,165	41,135	20,567.50	1,417	42,510	19,129.50
Emmer ("speltz")..bu.	80	960	441.60	53	1,113	523.11
Buckwheat..........bu.	....	....	....	1	9	9.00
Irish potatoes........bu.	714	22,134	26,118.12	893	81,263	66,635.66
Sweet potatoes......bu.	8	528	660.00	13	1,144	1,292.72
Castor-beans........bu.	....	....	....	....	....	....
Cotton..............lbs.	....	....	....	....	....	....
Flax................bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	....	....	....	....	....	....
Millet & hungarian, tons	205	308	2,310.00	130	325	1,625.00
Sugar-beets.......tons	1	4	20.00	2	20	100.00
Sorghum for—						
syrup or sugar...gals.	68	4,420	2,210.00	27	1,890	945.00
forage or grain..tons	2,760	....	24,840.00	5,073	....	55,803.00
Milo maize........tons	256	512	3,328.00	825	2,475	12,375.00
Kafir-corn........tons	6,813	13,626	81,756.00	10,626	37,191	167,359 50
Jerusalem corn....tons	22	44	264.00	19	66	297.00
Timothy..........tons	....	* 18,869	207,559.00	....	† 20,012	190,114.00
Clover............tons	....			....		
Blue-grass........tons	2			....		
Alfalfa...........tons	8,055			8,393		
Orchard-grass.....tons	....			1		
Other tame grasses, tons	....			27		
Prairie-grass fnc'd, tons	124,349	11,505	103,545.00	115,435	7,514	60,112.00
Totals............	456,711	....	$3,259,823.86	458,756	....	$3,600,427.04

Corn on hand March 1, 1911, 418,656 bushels; March 1, 1912. 148,952 bushels.
Wheat on hand March 1, 1911, 926,580 bushels; March 1, 1912, 180,455 bushels.

*** Product of 1910.** **† Product of 1911.**

SUMMARY.—BARTON COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops..........................acres	**456,711**	**$3,259,823.86**	**458,756**	**$3,600,427.04**
Animals slaughtered and sold for slaughter....	....	**293,268.00**	....	**346,608.00**
Poultry and eggs sold.......................	....	**115,741.00**	....	**103,956.00**
Wool clip..............................lbs.	**30**	**5.10**	**15**	**3.00**
Cheese.................................lbs.	....	....	**55**	**7.70**
Butter.................................lbs.	**1,111,181**	**321,715.44**	**1,098,327**	**311,381.75**
Milk sold...............................	....	**55,747.00**	....	**55,690.00**
Honey and beeswax......................lbs.	**5,046**	**763.90**	**1,131**	**171.65**
Wood marketed...........................	....	**15.00**	....	....
Totals..................................	....	**$4,047,079.30**	....	**$4,418,245.14**

LIVE STOCK.—BARTON COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	13,361	$1,509,798.00	13,209	$1,492,617.00	477	600
Mules and asses	3,386	443,566.00	3,492	457,452.00	37	47
Milch cows	7,490	299,600.00	8,277	372,465.00	109	204
Other cattle	11,550	311,850.00	11,352	363,264.00	315	521
Sheep	454	1,906.80	3,106	13,200.50	2	11
Swine	13,070	137,700.00	7,116	71,160.00	949	3,923
Totals	49,311	$2,697,415.80	46,552	$2,770,158.50	1,889	5,306

Number of dogs in county March 1, 1911, 2433; March 1, 1912, 2419.
Number of sheep killed by dogs, year ending March 1, 1911, 4; March 1, 1912, 2.

BOURBON COUNTY.

Organized in 1855; area, 637 square miles; population, 25,231; rank in population, 15; assessed valuation, $30,085,943; miles of railroad, main track, 124.14; county seat, Fort Scott, population, 11,830.

POPULATION AND VALUATION.—BOURBON COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.*	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county	25,231	....	$12,662,871	$5,530,142	$6,626,642	$5,266,288	$30,085,943
Drywood tp	1,300	....	$884,631	$41,745	$233,397	$567,543	$1,727,316
Franklin tp	1,147	....	1,191,391	3,915	234,235	21,252	1,450,883
Fulton	406 } 1,206	....	....	111,666	176,188	27,937	315,791
Freedom tp	800	....	966,860	4,000	211,424	204,671	1,386,955
Bronson	580	....	....	211,265	265,038	14,217	490,520
Uniontown	300 } 2,275	....	....	58,485	93,366	17,610	169,461
Marion tp	1,395	....	1,834,871	....	375,754	410,547	2,621,172
Redfield	250 } 1,227	....	....	58,010	60,060	12,745	130,815
Marmaton tp	977	....	1,063,030	3,355	250,343	615,903	1,932,631
Mill Creek tp	976	....	1,000,246	20,180	203,560	191,793	1,415,779
Osage tp	935	....	1,211,367	6,810	257,395	350,538	1,826,110
Pawnee tp	925	....	841,968	47,448	257,279	453,517	1,600,212
Scott tp	1,616	....	1,860,188	....	554,708	1,343,701	3,758,597
Mapleton	236 } 1,026	....	....	64,892	74,365	14,075	153,332
Timber Hill tp	790	....	691,909	....	163,000	125,030	979,939
Walnut tp	768	....	1,116,410	....	196,360	146,904	1,459,674
Fort Scott	11,830	....	....	4,898,371	3,020,080	748,305	8,666,756

* No enumeration made in 1912.

FARM AND CROP STATISTICS.—BOURBON COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	6,238	99,808	$82,840.64	5,069	65,897	$56,671.42
Spring wheat.......bu.	32	400	814.00	....	....	....
Corn..............bu.	72,022	1,512,462	862,108.84	78,410	1,646,610	905,685.50
Oats..............bu.	19,690	295,350	118,140.00	9,978	299,190	118,692.20
Rye...............bu.	14	210	168.00	29	435	326.25
Barley............bu.	11	176	88.00	....	....	....
Emmer ("speltz")..bu.	24	360	162.00	....	....	....
Buckwheat.........bu.	....	....	....	2	22	22.00
Irish potatoes.......bu.	764	16,808	16,808 00	540	45,900	33,507.00
Sweet potatoes.....bu.	....	....	....	7	651	651.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	8,396	25,188	45,338.40	5,839	32,084	48,051.00
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	50	25,000	1,750.00	11	6,600	280.50
Millet & hungarian, tons	849	1,698	10,188.00	1,398	2,786	18,930.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	1,159	96,197	47,136.53	2,157	161,775	77,652.00
forage or grain..tons	1,557	....	15,570.00	3,158	....	31,580.00
Milo maize........tons	22	77	462.00	83	207	1,035.00
Kafir-corn........tons	5,171	25,855	129,275.00	12,295	36,885	165,982.50
Jerusalem corn....tons	....	....	....	43	129	580.50
Timothy..........tons	29,442	* 23,068	276,816.00	21,617	† 19,320	212,520.00
Clover...........tons	4,397			2,573		
Blue-grass........tons	2,659			5,123		
Alfalfa...........tons	1,166			1,550		
Orchard-grass.....tons	77			9		
Other tame grasses, tons	3,701			2,813		
Prairie-grass fnc'd, tons	125,459	24,551	220,959.00	117,018	23,493	199,690.50
Totals.............	282,900	....	$1,828,118.91	269,212	....	$1,861,807.37

Corn on hand March 1, 1911, 332,583 bushels; March 1, 1912, 210,590 bushels.
Wheat on hand March 1, 1911, 1780 bushels; March 1, 1912, 2255 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—BOURBON COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops..............................acres	282,900	$1,828,118.91	266,212	$1,861,807.3
Animals slaughtered and sold for slaughter....	....	710,974.00	....	646,355.00
Poultry and eggs sold..........................	....	156,385.00	....	144,556.00
Wool clip..............................lbs.	6,065	1,031.05	7,149	1,429.80
Cheese.................................lbs.	700	91.00	....	....
Butter.................................lbs.	611,172	161,321.28	564,293	150,373.09
Milk sold......................................	....	82,502.00	....	77,869.00
Honey and beeswax......................lbs.	6,088	914.60	5,677	851.55
Wood marketed..................................	....	1,808.00	....	2,195.00
Totals...	....	$2,943,145.84	....	$2,885,436.81

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LIVE STOCK.—BOURBON COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	12,230	$1,381,990.00	12,962	$1,464,706.00	240	227
Mules and asses	2,281	298,811.00	2,510	328,810.00	20	11
Milch cows	9,515	380,600.00	10,835	487,575.00	149	151
Other cattle	14,755	398,385.00	13,055	417,760.00	235	285
Sheep	2,764	11,608.80	3,096	13,158.00	18	96
Swine	28,877	238,770.00	23,948	239,480.00	1,476	994
Totals	65,422	$2,710,164.80	66,406	$2,951,489.00	2,138	1,764

Number of dogs in county March 1, 1911, 2304; March 1, 1912, 2079.
Number of sheep killed by dogs, year ending March 1, 1911, 5; March 1, 1912, 5.

BROWN COUNTY.

Organized in 1855; area, 576 square miles; population, 20,335; rank in population, 25; assessed valuation, $40,588,175; miles of railroad, main track, 97.25; county seat, Hiawatha, population, 3122.

POPULATION AND VALUATION.—BROWN COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county		21,987		20,335	$23,981,835	$4,213,170	$8,267,880	$4,125,920	$40,588,175
Hamlin	201	1,077	240	1,140	....	$75,110	$70,855	$11,718	$157,678
Hamlin tp	876		900		$2,070,160	56,165	476,696	276,732	2,879,753
Hiawatha	3,194	4,805	3,122	4,631	....	1,912,225	1,278,105	138,614	3,323,944
Hiawatha tp	1,611		1,509		3,339,860	....	722,100	594,080	4,656,030
Irving tp		1,066		1,052	1,882,810	....	408,920	3,463	2,295,193
Baker	*....	7,233	*....	5,747	....	13,675	....	....	13,675
Horton	4,688		3,242		....	1,391,580	847,385	32,484	2,271,449
Willis	157		200		....	48,290	123,990	14,215	186,496
Mission tp	2,388		2,305		3,945,000	10,065	702,128	1,331,701	5,988,894
Morrill	489	1,323	502	1,290	....	223,900	336,425	26,172	586,497
Morrill tp	834		788		1,880,290	2,520	378,185	218,437	2,479,432
Padonia tp		819		825	1,667,580	11,945	355 226	223,287	2,258,038
Powhattan	221	1,557	215	1,539	....	100,410	90,020	18,771	209,201
Powhattan tp	1,336		1,324		2,894,025	....	384,798	176,701	2,955,524
Robinson	427	1,329	465	1,392	....	134,285	215,470	11,464	361,219
Robinson tp	902		927		1,960,860	....	418,860	221,663	2 600,883
Fairview	347	1,532	382	1,506	....	128,705	234,885	26,823	390,413
Walnut tp	1,185		1,124		2,665,040	....	585,142	253,663	3,503,845
Everest	447	1,246	420	1,213	....	104,295	205,490	31,620	341,405
Washington tp	799		793		2,176,720	....	438,200	513,686	3,128,606

* Not reported separately from township.

FARM AND CROP STATISTICS.—BROWN COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	46,170	1,108,080	$919,706.40	41,909	1,089,634	$915,292.56
Spring wheat.......bu.	73	1,095	876.00	....	....	....
Corn...............bu.	121,486	3,401,608	1,802,852.24	112,594	3,940,790	2,206,842.40
Oats...............bu.	33,956	747,032	283,872.16	35,242	1,303,954	443,344.36
Rye................bu.	107	1,819	1,546.15	283	4,245	2,971.50
Barley.............bu.	631	13,882	7,635.10	126	3,402	1,462.86
Emmer ("speltz")..bu.	190	3,800	1,710.00	34	850	357.00
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	1,041	39,558	39,953.58	1,111	87,769	60,560.61
Sweet potatoes......bu.	9	585	731.25	3	285	256.50
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco...........lbs.	....	....	....	....	....	....
Broom-corn.......lbs.	....	....	....	....	....	....
Millet & hungarian, tons	66	132	924.00	195	390	2,340.00
Sugar-beets.......tons	19	95	475.00	....	....	....
Sorghum for—						
syrup or sugar...gals.	55	5,225	2,612.50	62	5,580	2,790.00
forage or grain..tons	30	....	330.00	322	....	4,830.00
Milo maize........tons	....	....	....	5	15	82.50
Kafir-corn........tons	175	700	3,850.00	514	2,056	10,280.00
Jerusalem corn....tons	....	....	....	10	40	200.00
Timothy..........tons	17,044	* 42,895	471,845.00	13,154	† 30,616	367,392.00
Clover...........tons	13,307			9,120		
Blue-grass........tons	15,258			17,748		
Alfalfa...........tons	5,821			6,326		
Orchard-grass.....tons	20			263		
Other tame grasses, tons	889			359		
Prairie-grass fnc'd, tons	50,429	1,734	17,340.00	53,227	1,345	12,105.00
Totals............	306,776	....	$3,556,259.38	292,607	....	$4,031,107.29

Corn on hand March 1, 1911, 1,567,255 bushels; March 1, 1912, 959,810 bushels.
Wheat on hand March 1, 1911, 9480 bushels; March 1, 1912, 72,540 bushels.

*** Product of 1910. † Product of 1911.**

SUMMARY.—BROWN COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops.........................acres	306,776	$3,556,259.38	292,607	$4,031,107.29
Animals slaughtered and sold for slaughter....	....	1,467,441.00	....	1,123,836.00
Poultry and eggs sold.......................	....	143,573.00	....	130,877.00
Wool clip............................lbs.	8,308	1,412.36	11,893	2,378.60
Cheese...............................lbs.	6	78	....	....
Butter...............................lbs.	242,840	58,281.60	266,845	66,711.25
Milk sold..................................	....	107,292.00	....	97,726.00
Honey and beeswax....................lbs.	15,280	2,294.60	10,555	1,583.75
Wood marketed.............................	....	2,039.00	....	1,158.00
Totals...................................	....	$5,338,593.72	....	$5,455,377.89

LIVE STOCK.—BROWN COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	13,049	$1,474,537.00	12,478	$1,409,449.00	280	339
Mules and asses	3,272	428,632.00	3,406	446,186.00	20	85
Milch cows	9,421	376,840.00	10,982	494,190 00	147	139
Other cattle	15,096	407,592.00	13,769	440,608.00	164	182
Sheep	4,474	18,790.80	4,289	18,228.25	241	34
Swine	42,185	421,350.00	23,160	231,600.00	902	22,017
Totals	87,447	$3,127,741.80	68,079	$3,040,261.25	1,754	22,796

Number of dogs in county March 1, 1911, 2025; March 1, 1912, 1979.
Number of sheep killed by dogs, year ending March 1, 1911, 14; March 1, 1912, 16.
Number of sheep killed by wolves year ending March 1, 1911, 4; March 1, 1912, 7.

BUTLER COUNTY.

Organized in 1855; area, 1428 square miles; population, 21,753; rank in population, 21; assessed valuation, $47,565,461; miles of railroad, main track, 177.14; county seat, El Dorado, population, 3100.

POPULATION AND VALUATION.—BUTLER COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county		21,927		21,753	$27,347,974	$3,214,463	$8,888,481	$8,114,543	$47,565,461
Augusta	1,305	1,856	1,355	1,887	....	$539,590	$336,510	$141,527	$1,017,627
Augusta tp	551		532		$973,980	....	276,250	594,683	1,844,913
Benton	218	763	220	786	....	92,520	86,412	22,483	201,415
Benton tp	545		516		962,615	....	152,350	192,723	1,307,688
Bloomington tp		481		473	714,575	....	153,020	1,027	868,622
Bruno tp		564		567	893,670	8,747	154,135	267,450	1,324,002
Chelsea tp		527		542	1,655,970	....	254,480	21,886	1,932,336
Clay tp		266		257	536,815	....	164,480	260	701,555
Clifford tp		611		537	980,235	....	310,330	1,078	1,291,643
Douglas	616	1,095	567	1,054	....	278,295	294,405	55,133	627,833
Douglas tp	479		487		958,910	....	214,725	405,473	1,579,108
El Dorado	3,046	3,603	3,100	3,732	....	1,518,389	1,111,765	219,628	2,849,782
El Dorado tp	557		632		1,260,486	8,440	212,374	890,500	2,371,800
Fairmount tp		652		626	1,034,200	30,900	329,865	314,334	1,709,299
Fairview tp		404		363	794,965	....	143,405	65,956	1,004,326
Glencoe tp		656		639	786,455	28,005	214,090	458,691	1,487,241
Hickory tp		423		389	764,930	....	166,560	263,350	1,194,840
Lincoln tp		522		527	1,512,430	3,557	184,430	867,678	2,568,095
Leon	442	826	429	818	....	104,875	87,085	25,200	217,160
Little Walnut tp	384		389		653,853	....	120,700	238,670	1,013,223
Logan tp		268		258	503,355	....	81,185	1,382	585,922
White Water	484	1,138	449	1,067	....	210,745	363,925	51,678	626,348
Milton tp	654		618		1,058,370	7,310	350,920	293,927	1,710,527
Murdock tp		545		485	1,101,860	....	239,865	3,195	1,344,920
Pleasant tp		596		618	826,015	....	166,985	380,364	1,373,364
Potwin	247	649	202	648	....	85,100	98,825	17,287	201,212
Plum Grove tp	402		446		958,770	....	224,335	136,020	1,319,125
Prospect tp		724		697	1,201,805	3,805	365,100	274,156	1,844,866
Richland tp		670		681	947,320	42,735	265,940	96,622	1,352,617
Rock Creek tp		366		365	578,715	....	167,785	25,073	771,573
Rosalia tp		550		615	808,290	29,020	169,785	357,399	1,364,494
Spring tp		563		580	748,570	....	153,055	403,216	1,304,841
Sycamore tp		682		642	1,699,205	46,465	589,650	23,901	2,359,221
Towanda	274	703	285	734	....	92,575	91,885	1,372	185,832
Towanda tp	429		449		821,300	....	160,270	227,507	1,209,077
Latham	321	655	306	675	....	83,390	98,110	13,298	194,798
Union tp	334		369		736,625	....	123,540	199,074	1,059,239
Walnut tp		569		541	873,685	....	209,950	561,342	1,644,977

FARM AND CROP STATISTICS.—BUTLER COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	4,421	79,578	$70,028.64	9,332	167,976	$142,779.60
Spring wheat.......bu.	80	1,200	984.00	....	....	....
Corn...............bu.	115,831	2,084,958	1,230,125.22	84,417	1,941,591	1,067,875.05
Oats...............bu.	37,292	895,008	340,103.04	25,008	650,208	253,581.12
Rye................bu.	183	3,660	3,111.00	347	6,593	4,615.10
Barley.............bu.	....	....	....	61	1,525	686.25
Emmer ("speltz")..bu.	....	....	....	6	162	74.52
Buckwheat..........bu.	....	....	....	2	20	20.00
Irish potatoes.......bu.	1,409	36,634	36,634.00	895	67,125	53,700.00
Sweet potatoes......bu.	6	300	300.00	2	170	170.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	681	2,724	4,767.00	114	684	1,026.00
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	25	10,000	650.00	8	4,400	176.00
Millet & hungarian, tons	3,524	7,048	42,288.00	2,205	4,410	23,152.50
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	523	31,380	15,690.00	1,232	86,240	41,395.20
forage or grain..tons	11,557	....	104,018.00	13,095	....	144,045.00
Milo maize........tons	462	1,155	8,358.00	532	1,596	7,182.00
Kafir-corn........tons	77,908	233,724	1,168,620.00	119,304	417,564	1,670,256.00
Jerusalem corn....tons	400	1,200	6,000.00	....	....	....
Timothy..........tons	174	* 41,821	334,568.00	64	† 47,753	429,777.00
Clover............tons	118			40		
Blue-grass........tons	1,329			485		
Alfalfa...........tons	33,097			34,668		
Orchard-grass.....tons	....			38		
Other tame grasses, tons	121			115		
Prairie-grass fnc'd, tons	338,469	45,696	319,872.00	282,148	36,160	253,120.00
Totals.............	627,610	....	$3,686,106.90	574,108	....	$4,093,631.34

Corn on hand March 1, 1911, 352,261 bushels; March 1, 1912, 310,105 bushels.
Wheat on hand March 1, 1911, 3200 bushels; March 1, 1912, 2280 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—BUTLER COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops............................acres	627,610	$3,686,106.90	574,108	$4,093,631.34
Animals slaughtered and sold for slaughter....	....	3,272,638.00	....	2,792,021.00
Poultry and eggs sold........................	....	246,832.00	....	222,026.00
Wool clip.............................lbs.	60,215	10,236.55	43,100	8,620.00
Cheese................................lbs.	3,229	419.77	330	46.20
Butter................................lbs.	454,836	109,160.64	417,024	104,256.00
Milk sold..................................	....	75,978.00	....	87,092.00
Honey and beeswax.....................lbs.	52,068	7,820.20	21,258	3,515.70
Wood marketed..............................	....	270.00	....	6,511.00
Totals.....................................	....	$7,409,462.06	....	$7,317,719.24

LIVE STOCK.—BUTLER COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	19,188	$2,168,244.00	19,598	$2,214,009.00	390	585
Mules and asses	4,239	555,309.00	4,613	604,308.00	24	32
Milch cows	14,006	560,240.00	16,872	759,240.00	133	235
Other cattle	49,764	1,348,628.00	55,488	1,775,616.00	432	826
Sheep	12,107	50,849.40	8,320	35,360.00	304	230
Swine	50,868	508,680.00	34,414	344,140.00	2,519	23,241
Totals	150,172	$5,186,950.40	139,300	$5,732,668.00	3,802	25,149

Number of dogs in county March 1, 1911, 3369; March 1, 1912, 2994.
Number of sheep killed by dogs, year ending March 1, 1911, 6; March 1, 1912, 40.
Number of sheep killed by wolves, year ending March 1, 1911, 118; March 1, 1912, 19.

CHASE COUNTY.

Organized in 1859; area, 750 square miles; population, 6808; rank in population, 76; assessed valuation, $18,914,809; miles of railroad, main track, 52.51; county seat, Cottonwood Falls, population, 855.

POPULATION AND VALUATION.—CHASE COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county	7,436	6,808	$11,327,429	$1,075,840	$3,054,710	$3,456,830	$18,914,809
Bazar tp.	493	484	$1,477,701	....	$226,720	$128,190	$1,832,611
Cedar tp.	906	835	1,516,855	$2,530	352,080	4,670	1,876,135
Cottonwood tp.	796	721	1,460,651	79,890	391,960	867,480	2,800,281
Elmdale	241 } 1,038	204 } 984	....	85,870	114,130	47,330	247,330
Diamond Creek tp.	797	780	2,003,859	....	293,780	838,900	3,136,539
Cottonwood Falls	944 } 1,447	855 } 1,360	....	557,980	600,130	41,310	1,199,420
Falls tp.	503	505	925,407	....	181,980	586,530	1,693,917
Matfield tp.	572	447	1,613,479	43,620	212,120	20,940	1,890,159
Strong	1,004 } 1,286	879 } 1,076	....	259,690	109,700	75,230	444,620
Strong tp.	282	197	867,184	....	117,070	321,590	1,305,854
Toledo tp.	898	901	1,461,993	46,260	455,040	524,660	2,487,943

FARM AND CROP STATISTICS.—CHASE COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat......bu.	2,201	48,422	$41,158.70	2,350	49,350	$41,454.00
Spring wheat......bu.	....	....	....	....	....	....
Corn......bu.	43,440	912,240	529,099.20	41,651	1,249,530	724,727.40
Oats......bu.	2,361	40,137	16,054.80	1,464	51,240	19,471.20
Rye......bu.	....	....	....	8	152	107.92
Barley......bu.	....	....	....	....	....	....
Emmer ("speltz")..bu.	....	....	....	....	....	....
Buckwheat......bu.	....	....	....	....	....	....
Irish potatoes......bu.	553	10,507	11,137.42	346	25,258	20,206.40
Sweet potatoes......bu.	....	....	....	....	....	....
Castor-beans......bu.	....	....	....	....	....	....

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FARM AND CROP STATISTICS.—CHASE COUNTY.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Cotton . . . . lbs.						
Flax . . . . bu.						
Tobacco . . . . lbs.						
Broom-corn . . . . lbs.						
Millet & hungarian, tons	1,085	2,170	$13,020.00	638	1,266	$6,330.00
Sugar-beets . . . . tons	1	5	25.00			
Sorghum for—						
syrup or sugar . . . gals.	7	525	262.50	141	10,575	4,970.25
forage or grain . . tons	3,016		24,128.00	3,528		35,280.00
Milo maize . . . . tons				602	1,505	6,772.50
Kafir-corn . . . . tons	10,400	41,600	208,000.00	14,141	42,423	169,692.00
Jerusalem corn . . . . tons						
Timothy . . . . tons		* 30,928	247,424.00	1	† 37,628	338,652.00
Clover . . . . tons						
Blue-grass . . . . tons	278			55		
Alfalfa . . . . tons	13,058			18,521		
Orchard-grass . . . . . tons						
Other tame grasses, tons						
Prairie-grass fnc'd, tons	268,216	8,195	57,365.00	263,306	12,975	90,825.00
Totals	339,716		$1,147,674.62	341,747		$1,458,488.67

Corn on hand March 1, 1911, 193,672 bushels; March 1, 1912, 87,251 bushels.
Wheat on hand March 1, 1912, 2770 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—CHASE COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops . . . . acres	339,716	$1,147,674.62	341,747	$1,458,488.67
Animals slaughtered and sold for slaughter		1,462,662.00		1,567,432.00
Poultry and eggs sold		54,140.00		61,212.00
Wool clip . . . . lbs.	925	157.25	20	4.00
Cheese . . . . lbs.				
Butter . . . . lbs.	99,890	23,973.60	86,544	21,636.00
Milk sold		14,284.00		13,201.00
Honey and beeswax . . . . lbs.	11,463	1,719.45	6,113	916.95
Wood marketed		150.00		2,419.00
Totals		$2,704,760.92		$3,125,309.62

LIVE STOCK.—CHASE COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	7,153	$808,289.00	5,947	$672,011.00	27	80
Mules and asses	1,353	177,243.00	1,255	164,405.00	1	
Milch cows	7,326	293,040.00	7,525	338,625.00		10
Other cattle	28,511	769,797.00	31,870	1,019,840.00	60	128
Sheep	8,276	34,759.20	727	3,080.75		2
Swine	13,876	138,760.00	11,634	116,340.00	184	614
Totals	66,495	$2,221,888.20	58,958	$2,314,310.75	272	834

Number of dogs in county March 1, 1911, 917; March 1, 1912, 1106.

CHAUTAUQUA COUNTY.

Organized in 1875; area, 651 square miles; population, 10,830; rank in population, 62; assessed valuation, $13,636,348; miles of railroad, main track, 94.01; county seat, Sedan, population, 1299.

POPULATION AND VALUATION.—CHAUTAUQUA COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county		10,917		10,830	$6,035,390	$1,068,105	$3,377,905	$3,154,948	$13,636,348
Chautauqua	383	1,785	346	1,722	....	$60,515	$55,625	$1,348	$117,488
Peru	416		476		....	97,770	83,300	2,610	183,680
Belleville tp	986		900		$498,600	1,680	370,175	655,920	1,526,375
Caneyville tp		707		725	693,500	1,085	269,255	39,530	1,003,320
Center tp		386		518	546,180	....	153,790	75,615	775,585
Harrison tp		785		692	699,640	36,390	294,155	520,560	1,550,745
Hendricks tp		777		791	375,600	68,850	202,365	367,660	1,014,475
Cedar Vale	961	1,717	907	1,677	....	304,170	332,890	25,470	662,530
Jefferson tp	756		770		725,000	2,580	287,680	35,610	1,050,870
Lafayette tp		404		378	433,600	....	124,135	13,970	571,705
Niotaze	209	841	230	836	....	94,490	64,730	44,050	203,270
Little Caney tp	632		606		391,500	....	124,990	386,510	903,000
Salt Creek tp		503		530	382,820	1,715	98,810	225,325	708,670
Sedan	1,340	1,833	1,299	1,795	....	394,300	369,105	36,490	799,895
Sedan tp	493		496		423,290	....	254,855	247,040	925,185
Summit tp		624		624	501,970	3,700	196,355	254,870	956,895
Washington tp		555		542	363,690	910	95,690	222,370	682,660

FARM AND CROP STATISTICS.—CHAUTAUQUA COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	8,480	118,720	$99,724.80	6,366	82,758	$67,861.56
Spring wheat.......bu.	....	....	....	....	....	....
Corn.......bu.	37,558	262,906	163,001.72	26,046	182,322	111,216.42
Oats.......bu.	8,574	180,054	72,021.60	3,525	112,800	47,376.00
Rye.......bu.	154	2,310	1,963.50	67	1,340	1,005.00
Barley.......bu.	....	....	....	....	....	....
Emmer ("speltz")..bu.	6	90	43.20	....	....	....
Buckwheat.......bu.	1	6	6.00	....	....	....
Irish potatoes.......bu.	532	6,916	6,916.00	270	13,500	10,800.00
Sweet potatoes.......bu.	45	2,250	2,812.50	21	1,470	1,470.00
Castor-beans.......bu.	....	....	....	....	....	....
Cotton.......lbs.	....	....	....	10	2,500	250.00
Flax.......bu.	579	2,027	3,547.25	170	1,020	1,530.00
Tobacco.......lbs.	1	800	80.00	....	....	....
Broom-corn.......lbs.	5	2,000	130.00	....	....	....
Millet & hungarian, tons	511	767	4,602.00	339	508	2,794.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	196	13,720	6,860.00	447	31,290	15,645.00
forage or grain..tons	9,480	....	75,840.00	11,474	....	97,529.00
Milo maize.......tons	64	224	1,344.00	161	322	1,771.00
Kafir-corn.......tons	17,624	88,120	484,660.00	28,465	56,930	284,650.00
Jerusalem corn....tons	159	795	4,373.00	....	....	....
Timothy.......tons	203	* 9,839	88,551.00	14	† 8,489	76,401.00
Clover.......tons	362			14		
Blue-grass.......tons	286			28		
Alfalfa.......tons	8,074.			7,889		
Orchard-grass.....tons	13			2		
Other tame grasses, tons	17			21		
Prairie-grass fnc'd, tons	150,211	14,460	101,220.00	179,900	11,420	79,940.00
Totals..........	243,135	....	$1,117,696.57	265,229	....	$800,238.98

Corn on hand March 1, 1911, 42,611 bushels; March 1, 1912, 31,789 bushels.
Wheat on hand March 1, 1911, 3537 bushels; March 1, 1912, 4045 bushels.
* Product of 1910. † Product of 1911.

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SUMMARY.—CHAUTAUQUA COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops .... acres	243,135	$1,117,696.57	265,229	$800,238.98
Animals slaughtered and sold for slaughter....	....	743,114.00	....	848,955.00
Poultry and eggs sold............	....	76,009.00	....	69,027.00
Wool clip............ lbs.	200	34.00	780	156.00
Cheese............ lbs.	....	....	....	....
Butter............ lbs.	220,648	52,955.52	178,649	44,662.25
Milk sold............	....	41,985.00	....	38,956.00
Honey and beeswax............ lbs.	2,407	361.05	816	122.40
Wood marketed............	....	119.00	....	282.00
Totals............	....	$2,032,274.14	....	$1,802,399.63

LIVE STOCK.—CHAUTAUQUA COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	**1911.**		**1912.**		**Mortality.**	
	Number.	**Value.**	**Number.**	**Value.**	**1911.**	**1912.**
Horses............	8,702	$983,326.00	8,485	$958,805.00	229	197
Mules and asses............	1,956	256,236.00	2,158	282,698.00	27	10
Milch cows............	7,703	308,360.00	9,059	407,655.00	111	145
Other cattle............	21,018	567,486.00	22,174	709,568.00	323	385
Sheep............	1,776	7.459.20	363	1,542.75	4	3
Swine............	18.697	136,970.00	10,867	108,670.00	320	1,048
Totals............	54,858	$2,259,837.20	53,106	$2,468,938.75	1,014	1,788

Number of dogs in county March 1, 1911, 1820; March 1, 1912, 1600.
Number of sheep killed by dogs, year ending March 1, 1911, 9; March 1, 1912, 1.
Number of sheep killed by wolves, year ending March 1, 1911, 1.

CHEROKEE COUNTY.

Organized in 1866; area, 589 square miles; population, 35,611; rank in population, 8; assessed valuation, $28,419,918; miles of railroad, main track, 127.60; county seat, Columbus, population, 3644.

POPULATION AND VALUATION.—CHEROKEE COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	**Population.**		**Assessed valuation of property.**				
	1911.	**1912.**	**Land.**	**City lots.**	**Personal.**	**Railroad, etc.**	**Total.**
The county.......	36,792	35,611	$12,551,417	$4,654,042	$5,030,435	$6,184,024	$28,419,918
Scammon.........	2,179 } 3,562	2,211 } 3,521	....	$329,866	$172,156	$62,827	$564,849
Cherokee tp.......	1,383	1,310	$494,940	8,755	103,864	275,138	882,697
Crawford tp.......	853	849	680,825	....	131,659	681,890	1,494,374
Garden tp.........	869	828	1,588,110	17,757	127,730	100,512	1,834,109
Lola tp...........	1,039	1,020	753,316	26,685	195,511	602,477	1,577,989
Galena...........	5,455 } 6,160	5,409 } 6,137	....	1,486,318	791,095	314,713	2,592,126
Lowell tp.........	705	728	283,867	....	65,081	281,732	630,680

POPULATION AND VALUATION.—CHEROKEE COUNTY.

Townships. (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal	Railroad, etc.	Total.
Lyon tp..........		946		878	$836,734	....	$165,758	....	$1,002,492
Mineral..........	1,591	5,388	1,780	5,435	....	$320,205	112,231	$6,236	438,672
Weir.............	2,189		2,100		....	375,358	155,674	103,860	634,892
Mineral tp........	1,608		1,555		874,242	20,931	173,248	612,106	1,680,527
Neosho tp.........		1,146		1,110	888,845	21,169	161,085	226,583	1,297,682
Pleasant View tp..		1,084		975	855,937	6,630	144,962	184,871	1,192,400
Ross tp...........		6,616		5,437	1,560,980	118,458	478,010	875,678	3,028,121
Columbus..........	3,314	4,311	3,644	4,611	....	1,221,392	889,584	124,774	2,235,750
Salamanca tp......	997		967		748,950	1,920	173,412	613,736	1,538,018
Shawnee tp........		906		857	669,132	16,545	171,329	351,317	1,208,323
Sheridan tp.......		1,385		1,453	1,333,050	7,470	307,947	246,323	1,894,790
Baxter Springs....	1,328	2,577	1,290	2,505	....	676,706	314,618	88,156	1,079,480
Spring Valley tp..	1,249		1,215		982,489	2,877	195,481	431,100	1,611,947

FARM AND CROP STATISTICS.—CHEROKEE COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	44,590	624,260	$530,621.00	49,488	494,880	$430,545.60
Spring wheat.......bu.	....	....	....	....	....	....
Corn...............bu.	65,199	1,108,383	598,526.82	71,680	573,440	344,064.00
Oats...............bu.	34,015	204,090	81,636.00	17,691	300,747	114,283.86
Rye................bu.	62	620	527.00	2	30	22.50
Barley.............bu.	73	1,095	602.25	10	200	90.00
Emmer ("speltz")..bu.	20	400	180.00	....	....	....
Buckwheat..........bu.	2	14	14.00	57	627	627.00
Irish potatoes.....bu.	769	11,535	14,418.75	707	35,350	25,806.50
Sweet potatoes.....bu.	260	14,820	22,230.00	151	11,325	11,325.00
Castor-beans.......bu.	10	100	125.00	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	789	2,367	4,260.60	65	390	585.00
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn.........lbs.	29	18,050	848.25	22	11,000	440.00
Millet & hungarian, tons	877	1,316	7,896.00	1,242	1,242	7,452.00
Sugar-beets.......tons	....	....	....	1	8	40.00
Sorghum for—						
syrup or sugar...gals.	152	12,160	6,080.00	217	10,850	5,099.50
forage or grain..tons	1,965	....	21,615.00	2,438	....	23,161.00
Milo maize.........tons	97	291	1,601.00	187	374	2,057.00
Kafir-corn.........tons	2,012	6,036	30,180.00	3,193	7,982	39,910.00
Jerusalem corn....tons	....	....	....	4	10	50.00
Timothy...........tons	2,492	* 3,094	34,034.00	339	* 651	6,510.00
Clover............tons	410			54		
Blue-grass........tons	355			114		
Alfalfa...........tons	160			163		
Orchard-grass.....tons	82			62		
Other tame grasses, tons	1,579			1,167		
Prairie-grass fnc'd, tons	74,080	24,946	224,514.00	73,647	20,407	163,256.00
Totals.............	230,079	....	$1,579,909.67	222,701	....	$1,175,323.96

Corn on hand March 1, 1911, 276,697 bushels; March 1, 1912, 189,612 bushels.
Wheat on hand March 1, 1911; 23,106 bushels; March 1, 1912, 14,640 bushels.

* Product of 1910. † Product of 1911.

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SUMMARY.—CHEROKEE COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops .... acres	230,079	$1,579,909.67	222,701	$1,175,823.96
Animals slaughtered and sold for slaughter	....	279,864.00	....	268,855.00
Poultry and eggs sold	....	109,346.00	....	100,008.00
Wool clip .... lbs.	6,308	1,072.36	6,325	1,265.00
Cheese .... lbs.	....	....	....	....
Butter .... lbs.	436,578	104,777.52	415,665	103,916.25
Milk sold	....	48,752.00	....	59,536.00
Honey and beeswax .... lbs.	7,925	1,197.95	505	75.75
Wood marketed	....	8,279.00	....	1,408.00
Totals	....	$2,133,198.50	....	$1,710,387.96

LIVE STOCK.—CHEROKEE COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number	Value.	Number.	Value.	1911.	1912.
Horses	11,448	$1,298,059.00	11,173	$1,262,549.00	447	399
Mules and asses	3,108	406,493.00	3,185	417,235.00	40	40
Milch cows	8,610	344,400.00	9,767	439,515.00	200	210
Other cattle	10,139	273,753.00	8,285	265,120.00	361	282
Sheep	2,072	8,702.40	2,905	12,346.25	84	261
Swine	20,322	203,220.00	18,288	132,880.00	447	2,629
Totals	55,689	$2,529,627.40	48,603	$2,529,645.25	1,579	3,821

Number of dogs in county March 1, 1911, 2565; March 1, 1912, 2435.
Number of sheep killed by dogs, year ending March 1, 1911, 22; March 1, 1912, 18.
Number of sheep killed by wolves, year ending March 1, 1911, 34; March 1, 1912, 12.

CHEYENNE COUNTY.

Organized in 1886; area, 1020 square miles; population, 3793; rank in population, 89; assessed valuation, $5,942,444; miles of railroad, main track, 22.33; county seat, St. Francis, population, 468.

POPULATION AND VALUATION.—CHEYENNE COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county	4,189	3,793	$4,114,100	$184,300	$1,079,917	$564,127	$5,942,444
Alexander tp	90	96	$225,050	....	$23,225	....	$248,275
Beaver tp	271	252	437,965	....	50,320	....	488,285
Benkleman	201	179	231,255	....	49,940	$747	281,942
Bird City	212 } 336	179 } 289	....	$88,575	74,525	41,282	154,382
Bird City tp	124	110	231,600	....	37,460	107,388	376,448
Calhoun tp	255	228	219,835	....	50,890	....	270,725

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POPULATION AND VALUATION.—CHEYENNE COUNTY.

Townships (and cities.)	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots	Personal.	Railroad, etc.	Total.
Cherry Creek tp...	271	276	$232,540	....	$45,920	$2,130	$280,590
Cleveland Run tp..	221	225	226,840	....	52,600	1,162	280,602
Dent tp...........	212	162	314,240	....	31,845	....	346,085
Eureka tp.........	254	237	270,875	....	36,950	1,298	309,123
Evergreen tp......	170	148	166,420	....	32,687	....	199,107
Jaqua tp..........	179	177	105,795	....	28,605	649	135,049
Jefferson tp.......	113	123	256,950	....	30,675	145,583	433,208
Lawn Ridge tp....	230	172	321,505	....	42,830	9	364,344
Nuttycombe tp....	240	235	133,585	....	46,350	812	180,747
Orlando tp........	89	64	149,575	$3,040	28,395	148,561	329,571
Porter tp.........	411	312	359,960	....	75,910	....	435,870
St. Francis.......	476 } 646	468 } 618	....	142,685	296,115	30,851	469,651
Wano............	170	150	230,110	....	44,675	83,655	358,440

FARM AND CROP STATISTICS.—CHEYENNE COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	9,128	45,640	$38,337.60	39,143	548,002	$405,521.48
Spring wheat.......bu.	25,910	20,875	16,700.00	22,432	268,319	208,717.92
Corn...............bu.	54,915	....	....	39,138	821,898	394,511.04
Oats...............bu.	2,929	....	....	3,242	77,808	29,567.04
Rye................bu.	103	....	....	418	7,524	5,266.80
Barley.............bu.	18,526	....	....	12,030	288,720	118,375.20
Emmer ("speltz")..bu.	215	....	....	221	5,083	2,439.84
Buckwheat.........bu.	3	....	....	....	....	....
Irish potatoes.......bu.	499	2,495	2,495.00	318	27,666	20,749.50
Sweet potatoes......bu.	5	100	125.00	3	240	240.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	30	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	1,620	202,500	9,112.50	1,902	833,076	18,744.21
Millet & hungarian, tons	2,293	2,293	18,344.00	1,974	3,948	17,766.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	748	18,700	9,350.00	223	15,610	7,180.60
forage or grain..tons	9,656	....	48,280.00	9,064	....	72,512.00
Milo maize........tons	27	27	216.00	863	1,726	9,493.00
Kafir-corn........tons	654	654	5,232.00	2,247	4,494	22,470.00
Jerusalem corn....tons	18	18	144.00	35	70	350.00
Timothy..........tons	....	* 3,261	39,132.00	....	† 1,622	12,165.00
Clover............tons	....			....		
Blue-grass........tons	....			10		
Alfalfa...........tons	1,338			1,113		
Orchard-grass.....tons	....			....		
Other tame grasses, tons	5			....		
Prairie-grass fnc'd, tons	133,650	3,821	38,210.00	141,142	2,738	15,059.00
Totals.............	262,272	....	$225,678.10	275,518	....	$1,361,128.63

Corn on hand March 1, 1911, 159,662 bushels; March 1, 1912, 12,681 bushels.
Wheat on hand March 1, 1911, 45,187 bushels; March 1, 1912, 12,923 bushels.

*** Product of 1910. † Product of 1911.**

SUMMARY.—CHEYENNE COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops .... acres	262,272	$225,678.10	275,518	$1,361,128.63
Animals slaughtered and sold for slaughter	....	161,386.00	....	81,546 00
Poultry and eggs sold	....	36,667.00	....	26,357.00
Wool clip .... lbs.	5,170	878.90	....	....
Cheese .... lbs.	....	....	....	....
Butter .... lbs.	73,312	17,594.88	57,446	14,361.50
Milk sold	....	15,563.00	....	14,289 00
Honey and beeswax .... lbs.	75	12.25	50	7.50
Wood marketed	....	800.00	....	....
Totals	....	$458,580.13	....	$1,497,689.63

LIVE STOCK.—CHEYENNE COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	6,966	$787,158.00	6,840	$772,920.00	180	215
Mules and asses	887	116,197.00	674	88,294.00	6	6
Milch cows	3,458	138,320.00	3,554	159,930.00	62	128
Other cattle	5,213	140,751.00	3,949	126,368.00	64	162
Sheep	59	247.80	63	267.75	1	....
Swine	4,850	48,500.00	3,250	32,500.00	76	54
Totals	21,433	$1,231,173.80	18,330	$1,180,279.75	389	565

Number of dogs in county March 1, 1911, 914; March 1, 1912, 752.
Number of sheep killed by dogs, year ending March 1, 1911, 1.

CLARK COUNTY.

Organized in 1885; area, 975 square miles; population, 4356; rank in population, 85; assessed valuation, $11,632,248; miles of railroad, main track, 38.26; county seat, Ashland, population 1020.

POPULATION AND VALUATION.—CLARK COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county		4,353		4,356	$6,474,896	$794,267	$2,818,834	$1,544 251	$11,632,248
Minneola	*....	870	359	819	....	$141,000	$173,985	$42,978	$357,963
Appleton tp	870		460		$1,285,267	....	219,005	402,985	1,907,257
Brown tp		216		272	602,816	....	188,893	379	787,088
Ashland	1,100	1,404	1,020	1,340	....	409,355	493,615	20,570	923,540
Center tp	304		320		856,139	....	236,968	320,680	1,413,787
Cimarron tp		130		104	441,942	....	127,925	....	569,867
Edwards tp		111		119	430,731	8,385	226,963	127,453	788,532
Englewood	630	740	623	761	....	226,387	242,874	62,029	531,290
Englewood tp	110		138		660,230	....	139,709	175,510	975,449
Lexington tp		263		266	582,876	....	261,562	972	845,410
Liberty tp		174		174	870,999	....	109,581	112	480,692
Sitka tp		305		347	673,915	14,140	229,231	389,878	1,307,164
Vesta tp		140		154	569,981	....	173,523	705	744,209

*** Population not reported separately from township in 1911.**

FARM AND CROP STATISTICS.—CLARK COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	39,768	198,840	$169,014.00	91,154	1,276,156	$969,878.56
Spring wheat.......bu.	140	560	436.80	....	....	....
Corn...............bu.	51,838	829,408	456,174.40	13,239	238,302	128,683.08
Oats...............bu.	10,430	208,600	93,870.00	5,732	200,620	86,266.60
Rye................bu.	316	2,212	1,769.60	186	2,418	1,692.60
Barley.............bu.	8,448	152,064	76,032.00	1,622	32,440	15,246.80
Emmer ("speltz")..bu.	151	906	453.00	....	....	....
Buckwheat..........bu.	....	....	....	....	....	....
Irish potatoes.....bu.	140	4,900	6,125.00	78	5,460	4,914.00
Sweet potatoes.....bu.	7	420	546.00	5	425	425.00
Castor-beans.......bu.	....	....	....	....	....	....
Cotton.............lbs.	20	4,000	400.00	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn.........lbs.	125	43,750	2,625.00	320	160,000	4,000.00
Millet & hungarian, tons	296	444	2,664.00	258	387	2,128.50
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	15	900	450.00	....	....	....
forage or grain..tons	9,940	....	79,520.00	9,563	....	105,193.00
Milo maize........tons	1,645	4,113	24,678.00	2,048	4,096	22,528.00
Kafir-corn........tons	15,974	47,922	239,610.00	13,318	39,954	199,770.00
Jerusalem corn....tons	60	180	900.00	....	....	....
Timothy...........tons	....	* 4,066	40,660.00	....	† 6,305	56,745.00
Clover............tons	....			....		
Blue-grass........tons	....			....		
Alfalfa...........tons	4,761			3,870		
Orchard-grass.....tons	....			....		
Other tame grasses, tons	....			....		
Prairie-grass fnc'd, tons	325,011	1,463	11,704.00	266,613	1,139	7,973.00
Totals.............	469,085	....	$1,207,631.80	408,006	....	$1,505,444.14

Corn on hand March 1, 1911, 54,775 bushels: March 1, 1912, 24,735 bushels.
Wheat on hand March 1, 1911, 137,009 bushels; March 1, 1912, 13,774 bushels.

*** Product of 1910. † Product of 1911.**

SUMMARY.—CLARK COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops..........................acres	469,085	$1,207,631.80	408,006	$1,605,444.14
Animals slaughtered and sold for slaughter....	....	907,526.00	....	590,029.00
Poultry and eggs sold......................	....	16,084.00	....	21,024.00
Wool clip..............................lbs.	35,600	6,052.00	34,000	6,800.00
Cheese.................................lbs.	50	6.50	39	5.46
Butter.................................lbs.	54,230	13,015.20	51,288	12,822.00
Milk sold..................................	....	4,842.00	....	4,015.00
Honey and beeswax......................lbs.	....	....	....	....
Wood marketed..............................	....	....	....	....
Totals.....................................	....	$2,155,157.50	....	$2,240,139.60

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LIVE STOCK.—CLARK COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	4,496	$508,048.00	4,771	$539,123.00	144	265
Mules and asses	1,479	193,749.00	1,674	219,294.00	19	14
Milch cows	5,805	232,200.00	6,892	310,140.00	22	79
Other cattle	31,119	840,213.00	28,006	896,192.00	321	359
Sheep	4,411	18,526.20	4,425	18,806.25	....	172
Swine	2,879	28,790.00	3,090	30,900.00	116	462
Totals	50,189	$1,821,526.20	48,858	$2,014,455.25	622	1,351

Number of dogs in county March 1, 1911, 486; March 1, 1912, 466.
Number of sheep killed by wolves, year ending March 1, 1911, 20; March 1, 1912, 36.

CLAY COUNTY.

Organized in 1866; area, 660 square miles; population, 15,772; rank in population, 42; assessed valuation, $29,091,462; miles of railroad, main track, 95.77; county seat, Clay Center, population, 3800.

POPULATION AND VALUATION.—CLAY COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county	15,532	15,772	$16,691,853	$2,806,808	$6,233,786	$3,359,015	$29,091,462
Athelstane tp	607	593	$914,285	$13,335	$231,520	$1,468	$1,160,608
Blaine tp	594	595	1,253,095	....	209,794	82,220	1,545,169
Bloom tp	719	932	1,109,936	....	204,275	58	1,314,269
Longford	218 } 747	250 } 762	....	41,990	94,794	18,435	155,219
Chapman tp	529	512	707,021	....	181,156	236,784	1,124,961
Clay Center	3,542 } 4,488	3,800 } 4,770	....	1,976,461	1,579,263	152,422	3,708,146
Clay Center tp	946	970	1,331,300	47,075	307,759	1,001,667	2,687,801
Exeter tp	483	462	963,690	....	149,495	734	1,113,919
Five Creeks tp	612	609	742,525	63,950	328,116	119,566	1,254,157
Garfield tp	570	549	930,371	....	195,110	738	1,126,219
Gill tp	459	438	646,450	....	149,077	975	796,502
Goshen tp	530	506	810,712	....	169,891	1,595	982,198
Grant tp	445	416	685,257	....	185,808	338,859	1,209,924
Hayes tp	580	563	1,069,536	....	210,667	70,305	1,350,508
Green	290 } 905	316 } 913	....	87,410	173,925	4,117	265,452
Highland tp	615	597	873,930	....	193,8.9	89,578	1,157,367
Clifton	273 } 933	238 } 883	....	138,620	216,788	43,528	398,936
Vining	98	98	....	36,820	11,865	20	48,705
Mulberry tp	562	547	1,128,281	....	173,364	138,389	1,440,034
Oakland tp	525	516	570,364	37,575	165,685	182,250	955,874
Wakefield	505 } 1,015	503 } 1,000	....	240,570	388,326	2,626	631,522
Republican tp	510	497	968,170	....	207,896	166,556	1,342,622
Morganville	295 } 820	280 } 790	....	123,002	166,980	33,224	323,206
Sherman tp	525	510	1,144,720	....	180,822	671,748	1,997,290
Union tp	500	475	842,210	....	157,551	1,153	1,000,914

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FARM AND CROP STATISTICS.—CLAY COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	74,318	1,189,088	$1,034,506.56	57,497	747,461	$612,918.02
Spring wheat.......bu.	60	720	561.60	....	....	....
Corn...............bu.	86,421	1,209,894	653,342.76	97,689	1,953,780	996,427.80
Oats...............bu.	39,446	670,582	254,821.16	37,318	1,119,540	414,229.80
Rye................bu.	139	1,807	1,535.95	109	1,962	1,412.64
Barley.............bu.	....	....	....	....	....	....
Emmer ("speltz")..bu.	57	1,140	513.00	....	....	....
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	865	22,490	24,064.30	695	56,990	41,602.70
Sweet potatoes......bu.	1	97	121.25	1	100	100.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	....	....	....	....	....	....
Millet & hungarian, tons	2,638	3,957	23,742.00	1,668	3,336	18,348.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	63	4,725	2,362.50	21	1,365	655.20
forage or grain..tons	1,149	....	9,192.00	3,451	....	41,412.00
Milo maize........tons	21	63	378.00	116	348	1,914.00
Kafir-corn........tons	3,627	9,068	45,340.00	5,048	17,668	88,340.00
Jerusalem corn....tons	9	23	115.00	8	28	140.00
Timothy..........tons	21	* 30,429	334,719.00	6	† 13,501	135,010.00
Clover............tons	4			9		
Blue-grass........tons	227			42		
Alfalfa...........tons	16,456			17,310		
Orchard-grass.....tons	5			5		
Other tame grasses, tons	31			9		
Prairie-grass fnc'd, tons	109,809	15,837	142,533.00	106,967	6,428	54,638.00
Totals.............	335,367	....	$2,527,848.08	327,969	....	$2,407,148.16

Corn on hand March 1, 1911, 917,947 bushels; March 1, 1912, 321,107 bushels.
Wheat on hand March 1, 1911, 133,829 bushels; March 1, 1912, 74,795 bushels.

*** Product of 1910. † Product of 1911.**

SUMMARY.—CLAY COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops..........................acres	335,367	$2,527,848.08	327,969	$2,407,148.16
Animals slaughtered and sold for slaughter....	....	1,177,422.00	....	1,018,209.00
Poultry and eggs sold..........................	....	176,461.00	....	151,532.00
Wool clip.................................lbs.	3,210	545.70	2,260	452.00
Cheese....................................lbs.	1,125	146.25	222	31.08
Butter....................................lbs.	328,228	78,774.72	318,188	79,547.00
Milk sold..	....	67,204.00	....	74,280.00
Honey and beeswax.....................lbs.	7,870	1,190.10	807	121.05
Wood marketed................................	....	859.00	....	407.00
Totals..	....	$4,030,450.85	....	$3,731,727.29

LIVE STOCK.—CLAY COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	12,489	$1,411,257.00	11,504	$1,299,952.00	160	368
Mules and asses	2,381	311,911.00	2,241	293,571.00	16	12
Milch cows	9,445	377,800.00	10,615	477,675.00	71	126
Other cattle	21,452	579,204.00	16,970	543,040.00	219	279
Sheep	468	1,965.60	500	2,125.00	4	20
Swine	33,274	332,740.00	26,402	264,020.00	604	6,186
Totals	79,509	$3,014,877.60	68,232	$2,880,383.00	1,074	6,991

Number of dogs in county March 1, 1911, 2041; March 1, 1912, 1949.
Number of sheep killed by dogs, year ending March 1, 1911, 1.
Number of sheep killed by wolves, year ending March, 1, 1912, 19.

CLOUD COUNTY.

Organized in 1866; area, 720 square miles; population, 19,302; rank in population, 29; assessed valuation, $33,894,656; miles of railroad, main track, 125.54; county seat, Concordia, population, 4998.

POPULATION AND VALUATION.—CLOUD COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county	19,004	19,302	$18,708,783	$4,287,660	$6,363,585	$4,534,628	$33,894,656
Arion tp	534	535	$815,097	....	$133,415	$5,683	$954,195
Aurora	259 } 848	253 } 840	....	$60,760	120,600	11,287	192,647
Aurora tp	589	587	933,021	2,380	131,070	264,649	1,331,120
Buffalo tp	633	631	1,331,765	1,425	284,940	602,015	2,220,145
Center tp	682	731	1,154,235	....	160,380	1,821	1,316,436
Colfax tp	600	597	784,266	....	86,110	3,545	873,921
Clyde	1,247 } 1,739	1,104 } 1,592	....	559,945	373,420	86,529	1,019,894
Elk tp	492	488	914,045	....	144,010	511,573	1,569,628
Jamestown	518 } 1,030	647 } 1,174	....	206,490	188,520	33,648	428,658
Grant tp	512	527	1,093,257	....	175,700	289,928	1,558,885
Lawrence tp	696	651	1,129,822	19,740	233,350	670,981	2,053,893
Concordia	4,657 } 5,131	4,998 } 5,466	....	2,819,755	1,731,210	226,670	4,777,635
Lincoln tp	474	468	765,436	....	140,225	618,719	1,524,380
Lyon tp	590	591	1,332,634	....	272,630	75,565	1,680,829
Meridith tp	456	502	712,229	....	135,840	2,710	850,779
Nelson tp	562	535	1,023,478	....	165,870	152,594	1,341,942
Oakland tp	422	389	761,868	....	120,870	101,207	983,945
Shirley tp	918	949	1,373,543	28,465	281,920	162,621	1,846,549
Sibley tp	506	534	1,035,389	....	155,750	58,511	1,249,650
Glasco	746 } 1,399	706 } 1,400	....	244,580	364,985	8,316	617,881
Solomon tp	653	694	1,590,152	1,855	327,385	236,363	2,155,755
Miltonvale	1,070 } 1,569	994 } 1,520	....	337,015	309,565	52,002	698,582
Starr tp	499	526	759,958	5,250	132,430	311,042	1,208,680
Summit tp	689	665	1,198,588	....	193,390	46,649	1,438,627

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FARM AND CROP STATISTICS.—CLOUD COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat........bu.	104,586	1,568,790	$1,364,847.30	122,483	2,204,694	$1,785,802.14
Spring wheat........bu.	14	168	142.80	....	....	....
Corn................bu.	89,532	1,611,576	902,482.56	80,656	2,258,368	1,129,184.00
Oats................bu.	30,737	553,266	232,371.72	21,629	735,386	272,092.82
Rye.................bu.	35	420	357.00	36	648	460.08
Barley..............bu.	12	192	96.00	15	375	157.50
Emmer ("speltz")..bu.	....	....	....	....	....	....
Buckwheat...........bu.	....	....	....	....	....	....
Irish potatoes......bu.	1,068	28,836	28,836.00	896	79,744	63,795.20
Sweet potatoes......bu.	2	146	182.50	3	270	270.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton..............lbs.	....	....	....	....	....	....
Flax................bu.	....	....	....	....	....	....
Tobacco.............lbs.	....	....	....	....	....	....
Broom-corn..........lbs.	15	6,000	390.00	16	8,000	320.00
Millet & hungarian, tons	614	1,228	7,368.00	558	976	4,880.00
Sugar-beets.........tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	86	6,020	3,010.00	128	7,680	3,840.00
forage or grain..tons	3,095	....	24,760.00	4,895	....	48,950.00
Milo maize..........tons	13	33	198.00	77	192	1,056.00
Kafir-corn..........tons	2,039	6,117	30,585.00	2,830	8,490	38,205.00
Jerusalem corn......tons	78	234	1,170.00	9	27	121.50
Timothy.............tons	19	* 40,030	400,300.00	7	† 16,113	145,017.00
Clover..............tons	....			....		
Blue-grass..........tons	25			....		
Alfalfa.............tons	22,589			21,977		
Orchard-grass.......tons	6			1		
Other tame grasses, tons	42			71		
Prairie-grass fnc'd, tons	100,350	8,858	75,293.00	111,422	6,032	45,240.00
Totals..............	354,957	....	$3,072,389.88	367,709	....	$3,539,391.24

Corn on hand March 1, 1911, 696,430 bushels; March 1, 1912, 322,757 bushels.
Wheat on hand March 1, 1911, 203,400 bushels; March 1, 1912, 149,115 bushels.

*** Product of 1910. † Product of 1911.**

SUMMARY.—CLOUD COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops..........................acres	**354,957**	**$3,072,389.88**	**367,709**	**$3,539,391.24**
Animals slaughtered and sold for slaughter....	....	**783,817.00**	....	**850,069.00**
Poultry and eggs sold.......................	....	**171,609.00**	....	**165,265.00**
Wool clip............................lbs.	**3,400**	**578.00**	**320**	**64 00**
Cheese...............................lbs.	**100**	**13.00**	**2,350**	**329.00**
Butter...............................lbs.	**1,637,156**	**472,539.90**	**2,348,293**	**667,073.25**
Milk sold...................................	....	**82,731.00**	....	**81,962.00**
Honey and beeswax....................lbs.	**16,088**	**2,414.30**	**3,742**	**566 40**
Wood marketed...............................	....	....	....	**325.00**
Totals......................................	....	**$4,586,092.08**	....	**$5,305,044.89**

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LIVE STOCK.—CLOUD COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	14,297	$1,615,561.00	13,996	$1,581,548.00	196	304
Mules and asses	2,410	315,710.00	2,535	332,085.00	17	22
Milch cows	8,968	358,720.00	9,775	489,875.00	89	103
Other cattle	15,526	419,202.00	12,905	412,960.00	238	275
Sheep	16,462	69,140.40	989	4,203.25	126	17
Swine	26,872	263,720.00	25,142	251,420.00	5,005	2,663
Totals	84,035	$3,042,053.40	65,342	$3,022,091.25	5,671	3,384

Number of dogs in county March 1, 1911, 2285; March 1, 1912, 2496.

COFFEY COUNTY.

Organized in 1859; area, 648 square miles; population, 15,099; rank in population, 45; assessed valuation, $23,061,710; miles of railroad, main track, 117.68; county seat, Burlington, population, 2225.

POPULATION AND VALUATION.—COFFEY COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county	14,677	15,099	$12,622,014	$1,942,834	$4,400,080	$4,096,782	$23,061,710
Avon tp	685	682	$613,715	$27,787	$202,254	$148,726	$992,482
Burlington	2,146 } 2,804	2,225 } 2,908	....	1,086,170	779,351	83,265	1,948,786
Burlington tp	658	683	825,486	....	214,095	355,220	1,394,801
California tp	795	824	886,722	14,463	217,075	167,322	1,285,582
Hampden tp	528	533	594,932	....	98,265	220,089	913,286
Key West tp	905	920	888,156	25,430	222,095	8,161	1,143,842
Le Roy	830 } 1,114	805 } 1,115	....	218,260	156,168	91,914	466,342
Le Roy tp	284	310	410,865	....	74,595	384,156	869,616
Gridley	218 } 1,172	261 } 1,254	....	83,253	121,552	33,220	238,025
Liberty tp	954	993	1,189,729	....	335,645	381,507	1,906,881
Lebo	498 } 951	504 } 1,050	....	179,240	210,445	89,052	478,737
Lincoln tp	453	546	909,187	....	168,650	563,882	1,641,719
Neosho tp	583	605	728,199	1,736	156,705	370,585	1,257,225
Ottumwa tp	952	1,025	920,866	17,130	206,695	195,125	1,339,816
Pleasant tp	714	705	1,076,594	....	249,275	110,027	1,435,896
Pottawatomie tp	787	846	1,021,811	....	243,195	33,784	1,298,790
Waverly	647 } 1,588	647 } 1,526	....	275,125	267,010	40,423	582,558
Rock Creek tp	941	879	1,287,684	14,240	211,685	608,947	2,122,556
Spring Creek tp	562	521	681,246	....	129,370	209,920	1,020,536
Star tp	537	585	586,822	....	135,955	1,457	724,234

FARM AND CROP STATISTICS.—COFFEY COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	10,421	250,104	$212,588.40	12,583	238,127	$200,026.68
Spring wheat.......bu.	21	378	283.50			
Corn...............bu.	90,915	1,727,385	967,335.60	98,638	1,972,760	1,144,200.80
Oats...............bu.	22,399	447,980	179,192.00	8,078	266,574	101,298.12
Rye................bu.	191	4,011	3,369.24	255	5,100	3.672.00
Barley.............bu.	5	125	68.75			
Emmer ("speltz")..bu.	40	600	270.00			
Buckwheat..........bu.				20	260	260.00
Irish potatoes.......bu.	878	21,950	21,511.00	710	71,000	54,670.00
Sweet potatoes......bu.	38	2,280	2,850.00			
Castor-beans........bu.						
Cotton.............lbs.						
Flax...............bu.	9,173	27,519	49,534.20	5,408	32,448	48,672.00
Tobacco............lbs.						
Broom-corn........lbs.	9	3,600	252.00	3	1,500	60.00
Millet & hungarian, tons	472	944	5,664.00	489	1,222	6,415.50
Sugar-beets.......tons				6	54	270.00
Sorghum for—						
syrup or sugar...gals.	129	10,320	4,850.40	67	5,360	2,680.00
forage or grain..tons	1,170		9,360.00	3,402		34,020.00
Milo maize........tons	44	132	726.00	21	52	260.00
Kafir-corn........tons	9,353	32,736	163,680.00	21,239	63,717	286,726.50
Jerusalem corn....tons				1	3	13.50
Timothy..........tons	5,208	* 11,815	106,335.00	2,522	† 8,039	80,390.00
Clover............tons	11,282			8,819		
Blue-grass........tons	1,391			714		
Alfalfa...........tons	2,176			3,580		
Orchard-grass.....tons	6			45		
Other tame grasses, tons	2,648			1,880		
Prairie-grass fnc'd, tons	113,233	30,529	244,232.00	134,173	27,687	221,496.00
Totals............	281,192		$1,972,102.09	302,553		$2,185,181.10

Corn on hand March 1, 1911, 382,162 bushels; March 1, 1912, 272,318 bushels.
Wheat on hand March 1, 1911, 4470 bushels; March 1, 1912, 9226 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—COFFEY COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops..........................acres	281,192	$1,972,102.09	302,553	$2,185,131.10
Animals slaughtered and sold for slaughter....		851,767.00		908,596.00
Poultry and eggs sold....................		161,278.00		165,593.00
Wool clip..............................lbs.	4,721	802.57	7,750	1,550.00
Cheese.................................lbs.	213	27.69	165	23.10
Butter.................................lbs.	433,598	115,995.84	450,414	120,603.50
Milk sold................................		92,544.00		70,068.00
Honey and beeswax....................lbs.	8,800	1,320.70	3,466	537.60
Wood marketed...........................		2,209.00		516.00
Totals..................................		$3,198,046.89		$3,452,618.30

LIVE STOCK.—COFFEY COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	11,089	$1,247,407.00	11,224	$1,268,312.00	160	171
Mules and asses	2,377	311,387.00	2,635	345,185.00	12	8
Milch cows	8,958	358,320.00	10,949	492,705.00	79	84
Other cattle	18,848	508,896.00	18,406	588,992.00	188	121
Sheep	2,715	11,403.00	2,498	10,616.50	49	107
Swine	28,804	288,040.00	32,291	322,910.00	654	1,425
Totals	72,741	$2,725,453.00	78,003	$3,028,720.50	1,142	1,916

Number of dogs in county March 1, 1911, 2052; March 1, 1912, 2134.
Number of sheep killed by dogs, year ending March 1, 1911, 17.
Number of sheep killed by wolves, year ending March 1, 1911, 4; March 1, 1912, 26.

COMANCHE COUNTY.

Organized in 1885; area, 795 square miles; population, 4298; rank in population, 86; assessed valuation, $9,995,184; miles of railroad, main track, 27.59; county seat, Coldwater, population, 1026.

POPULATION AND VALUATION.—COMANCHE COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county	3,740	4,298	$6,121,802	$594,735	$2,223,515	$1,055,132	$9,995,184
Avilla	258	327	$1,151,580	....	$168,140	....	$1,319,720
Coldwater	887 } 1,495	1,026 } 1,666	....	$395,840	472,040	$50,428	918,308
Coldwater tp	608	640	1,693,024	....	338,605	504,397	2,536,026
Irwin tp	77	101	245,418	....	42,880	....	288,298
Logan tp	117	130	297,047	....	91,690	....	388,737
Nescatunga tp	137	170	313,409	....	74,485	393	388,287
Wilmore	*.... } 278	*.... } 463	376,904	36,395	175,225	249,483	838,007
Powell tp	278	463					
Protection	440 } 925	520 } 1,006	....	162,500	273,105	40,035	475,640
Protection tp	485	486	802,017	....	189,700	210,048	1,201,765
Rumsey tp	123	111	345,254	....	146,140	....	491,394
Shimer tp	138	142	364,269	....	166,815	....	531,084
Valley tp	192	182	532,880	....	84,690	348	617,918

*** Not reported separately from township in 1911 and 1912.**

FARM AND CROP STATISTICS.—COMANCHE COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	48,049	624,637	$537,187.82	98,252	1,492,032	$1,208,545.92
Spring wheat.......bu.	....	....	....	....	....	....
Corn.......bu.	29,518	236,144	141,686.40	14,588	277,172	144,129.44
Oats.......bu.	3,793	68,274	28,675.08	3,656	91,400	39,302.00
Rye.......bu.	743	7,430	5,944.00	632	8,848	6,193.60
Barley.......bu.	738	13,284	7,306.20	676	12,844	5,908.24

FARM AND CROP STATISTICS.—COMANCHE COUNTY.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Emmer ("speltz")..bu.	....	....	....	10	200	$96.00
Buckwheat.........bu.	....	....	....	16	128	128.00
Irish potatoes.......bu.	107	2,675	$2,942.50	116	9,860	8,381.00
Sweet potatoes......bu.	1	80	100.00	3	300	300.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco...........lbs.	....	....	....	....	....	....
Broom-corn........lbs.	210	68,250	4,436.25	280	140,000	4,200.00
Millet & hungarian, tons	195	293	1,758.00	122	244	1,342.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	42	2,730	1,365.00	....	....	....
forage or grain..tons	5,960	....	41,720.00	3,685	....	36,850.00
Milo maize........tons	131	393	2,358.00	898	2,245	11,225.00
Kafir-corn........tons	12,778	38,334	191,670.00	13,642	40,926	184,167.00
Jerusalem corn....tons	50	150	750.00	....	....	....
Timothy..........tons	....	* 4,085	36,765.00	....	† 4,402	39,618.00
Clover............tons	....			5		
Blue-grass........tons	....			....		
Alfalfa...........tons	3,459			3,982		
Orchard-grass.....tons	26			....		
Other tame grasses, tons	1			....		
Prairie-grass fnc'd; tons	273,459	1,660	11,620.00	244,787	2,189	15,323.00
Totals............	379,260	....	$1,016,284.25	380,350	....	$1,705,709.20

Corn on hand March 1, 1911, 33,523 bushels; March 1, 1912, 24,260 bushels.
Wheat on hand March 1, 1911, 106,707 bushels; March 1, 1912, 47,438 bushels.

*** Product of 1910. † Product of 1911.**

SUMMARY.—COMANCHE COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops..........................acres	379,260	**$1,016,284.25**	**380,350**	**$1,705,709.20**
Animals slaughtered and sold for slaughter....	....	**504,862.00**	....	**308,335.00**
Poultry and eggs sold..........	....	**24,923.00**	....	**22,143.00**
Wool clip..........................lbs.	350	59.50	**18,000**	**3,600.00**
Cheese............................lbs.			**100**	**14.00**
Butter............................lbs.	65,031	15,607.44	**64,203**	**16,060.75**
Milk sold..........................	....	6,081.00	....	**5,423.00**
Honey and beeswax..................lbs.	....	....	**50**	**7.50**
Wood marketed.....................	....	150.00	....	**2,628.00**
Totals..........................	....	**$1,567,967.19**	....	**$2,068,905.45**

LIVE STOCK.—COMANCHE COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses..................	**4,996**	**$564,548.00**	**5,276**	**$596,188.00**	**73**	**146**
Mules and asses............	**1,411**	**184,841.00**	**1,717**	**224,927.00**	**4**	**11**
Milch cows...............	**7,381**	**295,240.00**	**9,208**	**414,360.00**	**19**	**56**
Other cattle...............	**19,801**	**534,627.00**	**20,530**	**656,960.00**	**125**	**417**
Sheep....................	**2,965**	**12,453.00**	**3,102**	**13,183.50**	....	....
Swine....................	**5,291**	**52,910.00**	**3,100**	**31,000.00**	**554**	**3,784**
Totals...............	**41,845**	**$1,644,619.00**	**42,933**	**$1,936,618.50**	**775**	**4,414**

Number of dogs in county March 1, 1911, 558; March 1, 1912, 658.
Number of sheep killed by dogs, year ending March 1, 1911, 1; March 1, 1912, 150.
Number of sheep killed by wolves, year ending March 1, 1911, 11.

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COWLEY COUNTY.

Organized in 1870; area, 1112 square miles; population, 32,745; rank in population, 10; assessed valuation, $49,764,587; miles of railroad, main track, 224.22; county seat, Winfield, population, 7677.

POPULATION AND VALUATION.—COWLEY COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county	32,854	32,745	$20,779,341	$9,822,453	$9,857,455	$9,305,338	$49,764,587
Beaver tp	482	487	$1,051,156	....	$153,810	$163,799	$1,368,765
Bolton tp	1,070	1,124	1,439,568	$54,964	327,080	375,034	2,196,646
Cedar tp	339	224	444,766	....	116,980	68,823	630,569
Arkansas City	8,110 } 9,080	7,917 } 8,860	....	4,078,951	2,143,085	656,137	6,878,123
Creswell tp	970	943	1,099,745	36,975	272,280	643,864	2,052,864
Dexter	500 } 1,201	516 } 1,196	....	157,430	132,375	45,999	335,804
Dexter tp	701	680	1,021,606	4,360	332,380	318,616	1,676,962
Fairview tp	560	556	902,480	2,160	173,420	498,969	1,577,029
Grant tp	437	434	432,249	....	160,490	693	593,432
Harvey tp	523	558	683,579	....	167,195	31,958	882,732
Liberty tp	580	553	699,031	....	217,140	58,789	974,960
Maple tp	493	446	732,310	....	110,715	192,672	1,035,697
Udall	295 } 799	318 } 818	....	108,415	110,405	29,977	248,797
Ninnescah tp	504	500	913,766	745	132,425	473,552	1,520,488
Atlanta	355 } 724	403 } 801	....	81,360	96,645	21,336	199,341
Omnia tp	369	398	524,153	....	101,755	269,303	895,211
Otter tp	328	285	505,146	....	205,895	121,066	832,107
Pleasant Valley tp	802	799	1,410,167	3,810	248,180	597,061	2,259,218
Richland tp	1,146	1,173	1,247,459	29,293	290,730	556,517	2,123,999
Rock Creek tp	658	677	896,263	12,530	193,860	349,604	1,452,257
Sheridan tp	372	383	582,801	1,340	136,515	161,732	882,388
Burden	434 } 945	437 } 946	....	141,310	194,280	25,100	360,690
Silver Creek tp	511	509	761,641	....	174,190	268,133	1,203,964
Silverdale tp	690	681	709,000	24,005	235,925	316,127	1,285,057
Spring Creek tp	416	373	499,321	6,040	150,960	58,963	715,284
Tisdale tp	465	482	645,459	2,772	130,745	136,226	915,202
Vernon tp	727	727	1,347,848	11,285	253,315	870,881	2,483,329
Winfield	7,698 } 9,204	7,677 } 9,165	....	5,006,733	2,173,720	564,748	7,745,201
Walnut tp	1,506	1,488	1,219,054	4,410	352,665	669,082	2,245,211
Cambridge	*......	216 } 997	....	51,635	59,295	36,077	147,007
Windsor tp	813	781	1,010,773	1,930	309,050	724,500	2,046,253

* Not reported separately from township in 1911.

FARM AND CROP STATISTICS.—COWLEY COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat .... bu.	18,341	201,751	$173,505.86	21,648	368,016	$305,453.28
Spring wheat .... bu.	....	....	....	....	....	....
Corn .... bu.	112,968	1,694,520	982,821.60	94,728	1,705,014	903,657.42
Oats .... bu.	49,148	1,032,108	371,558.88	26,602	691,652	255,911.24
Rye .... bu.	865	8,650	6,920.00	609	12,180	8,769.60
Barley .... bu.	25	375	206.25	....	....	....
Emmer ("speltz") .. bu.	....	....	....	....	....	....
Buckwheat .... bu.	4	28	28.00	....	....	....
Irish potatoes .... bu.	946	18,920	18,920.00	695	59,075	46,078.50
Sweet potatoes .... bu.	70	3,780	4,422.60	69	5,037	5,037.00
Castor-beans .... bu.	....	....	....	....	....	....
Cotton .... lbs.	....	....	....	....	....	....
Flax .... bu.	106	371	649.25	....	....	....
Tobacco .... lbs.	....	....	....	....	....	....

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FARM AND CROP STATISTICS.—COWLEY COUNTY.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Broom-corn........lbs.	29	10,150	$659.75	... .	....	....
Millet & hungarian, tons	1,739	2,609	15,654.00	1,894	2,439	$12,804.75
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	340	25,500	12,750.00	550	41,250	20,625.00
forage or grain..tons	10,568	....	84,544.00	12,855	....	128,550.00
Milo maize........tons	149	447	2,682.00	181	452	2,260.00
Kafir-corn........tons	30,715	122,860	675,730.00	64,498	193,494	870,723.00
Jerusalem corn....tons	1	4	22.00	....	....	....
Timothy..........tons	111	* 31,298	281,682.00	17	† 89,071	351,639.00
Clover............tons	318			50		
Blue-grass........tons	1,435			190		
Alfalfa...........tons	29,563			81,812		
Orchard-grass.....tons	19			1		
Other tame grasses, tons	505			161		
Prairie-grass fnc'd, tons	257,590	21,066	147,462.00	258,273	29,702	222,765.00
Totals.............	515,550	....	$2,780,218.19	514,828	....	$3.134.273.79

Corn on hand March 1, 1911, 254,866 bushels; March 1, 1912, 344,668 bushels.
Wheat on hand March 1, 1911, 44,937 bushels; March 1, 1912, 13,440 bushels.
* Product of 1910. † Product of 1911.

SUMMARY.—COWLEY COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops............................acres	515,550	$2,780,218.19	514,828	$3,134,273.79
Animals slaughtered and sold for slaughter....	....	1,463,699.00	....	1,189,169.00
Poultry and eggs sold..........................	....	178,354.00	....	172,640.00
Wool clip..................................lbs.	6,688	1,136.96	7,961	1,592.20
Cheese.....................................lbs.	....	....	....	....
Butter.....................................lbs.	2,812,213	817,639.62	2,367,720	670,202.60
Milk sold....................................	....	143,784.00	....	135,553.00
Honey and beeswax.....................lbs.	16,433	2,466.95	6,280	943.00
Wood marketed............................	....	708.00	....	681.00
Totals....................................	....	$5,387,956.72	....	$5,305,054.59

LIVE STOCK.—COWLEY COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses......................	17,841	$2,016,083.00	17,988	$2,082,644.00	210	452
Mules and asses.............	4,156	544,436.00	4,596	602,076.00	22	22
Milch cows..................	13,584	543,360.00	15,900	715,500.00	201	334
Other cattle................	37,839	1,021,653.00	40,865	1.307.680.00	686	752
Sheep.......................	3,495	14,679.00	6,531	27,756.75	143	149
Swine.......................	43,891	438,910.00	27,519	275,190.00	682	21,756
Totals..................	120,806	$4.579,071.00	113,399	$4,960,846.75	1,944	23,465

Number of dogs in county March 1, 1911, 3621; March 1, 1912, 3538.
Number of sheep killed by dogs, year ending March 1, 1911, 5; March 1, 1912, 41.
Number of sheep killed by wolves, year ending March 1, 1911, 4; March 1, 1912, 56.

CRAWFORD COUNTY.

Organized in 1867; area, 592 square miles; population, 50,272; rank in population, 5; assessed valuation, $42,271,134; miles of railroad, main track, 170.90; county seat, Girard, population, 2464.

POPULATION AND VALUATION.—Crawford County.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......		52,154		50,272	$15,047,710	$10,675 035	$7,324,905	$9,228,484	$42,271,134
Litchfield.........	85	20,354	111	19,602					
Midway..........	120		81						
Opolis..........	201		194						
Chicopee.........	1,234		719						
Pittsburg.........	15,153		15,419		....	$7,273,740	$1,971,800	$1,715,730	$10,960,770
Fleming..........	95		89						
Baker tp..........	3,466		2,989		$1,687,620	303,015	447,045	1,748,464	4,181,144
Girard...........	2,564	4,029	2,464	3,867	....	1,015,435	745,185	183,766	1,944,386
Crawford tp......	1,465		1,403		1,529,515	7,320	343,900	854,299	2,785,034
Grant tp..........		943		910	1,155,745	....	199,210	47,373	1,402,328
Arcadia..........	753	4,015	769	4,519	....	127,860	115,155	74,232	317,247
North Mulberry...	347		483		†	† 194,415	† 111,895	† 20,810	† 327,120
Englevale........	163		167						
Lincoln tp........	2,752		3,150		1,651,015	59,315	351,360	647,632	2,709,322
McCune..........	729	1,973	702	1,967	....	195,255	217,985	25,617	438,857
Osage tp..........	1,244		1,265		1,489,855	....	345,050	212,036	2,046,941
Beulah...........	76	3,509	59	3,239					
Cherokee.........	1,380		1,337		....	388,585	224,930	140,636	754,151
Monmouth........	89		81						
Sheridan tp.......	1,964		1,762		1,837,075	37,390	380,565	732,987	2,988,017
Farlington.......	115	1,161	133	1,156	1,371,645	13,500	337,145	319,630	2,041,920
Sherman tp.......	1,046		1,023						
Prazilton.........	68	2,024	57	2,026					
Hepler...........	306		278		....	77,880	81,815	67,146	226,341
Walnut...........	612		682		....	178,275	214,325	166,874	559,474
Walnut tp........	1,038		1,009		1,371,850	11,915	230,575	630,063	2,244,408
Arma.............	467	10,920	629	10,106	....	96,400	50,100	28,853	175,353
Curranville.......	330		521		....	25,265	8,060	47,947	81,272
Croweburg.......	.....*		223						
South Mulberry...	774		736						
Yale.............	856		177						
Franklin.........	935		894						
Fuller............	442		293						
Radley...........	694		820						
Edison...........	170		198						
Dunkirk..........	532		555						
Washington tp....	5,720		5,060		2,958,390	270,445	867,600	1,433,019	5,524,454
Frontenac........		3,226		2,880	....	399,525	81,705	131,370	612,600

* Not reported separately from township in 1911.
† Includes South Mulberry, Washington township.

FARM AND CROP STATISTICS.—Crawford County.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	20,584	288,176	$233,422.56	24,613	270,743	$219,301.83
Spring wheat.......bu.	....	....	....	....	....	....
Corn...............bu.	81,155	1,623,100	876,474.00	81,905	1,064,765	638,859.00
Oats...............bu.	37,635	225,810	88,065.90	21,766	522,384	193,282.08
Rye................bu.	44	440	352.00	....	....	....
Barley.............bu.	6	90	49.50	2	36	15.84
Emmer ("speltz")..bu.	....	....	....	....	....	....
Buckwheat.........bu.	4	24	24.00	6	60	60.00

FARM AND CROP STATISTICS.—CRAWFORD COUNTY.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Irish potatoes.......bu.	465	6,975	$6,975.00	377	21,489	$15,686.97
Sweet potatoes......bu.	32	960	1,200.00	28	2,100	2,100.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	4,935	14,805	26,649.00	1,939	9,695	14,542.50
Tobacco...........lbs.	....	....	....	....	....	....
Broom-corn........lbs.	15	5,250	341.25	21	12,600	535.50
Millet & hungarian, tons	668	663	3,978.00	892	1,338	7,359.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	509	41,229	18,965.34	179	8,950	4,475.00
forage or grain..tons	752	....	6,768.00	2,430	....	21,870.00
Milo maize........tons	8	24	144.00	429	858	4,719.00
Kafir-corn........tons	3,031	12,124	60,620.00	7,021	17,552	87,760.00
Jerusalem corn....tons	471	1,884	9,420.00	509	1,272	6,360.00
Timothy..........tons	7,102	* 8,796	96,756.00	4,808	† 2,960	31,080.00
Clover............tons	1,408			542		
Blue-grass........tons	668			357		
Alfalfa...........tons	273			420		
Orchard-grass.....tons	5			37		
Other tame grasses, tons	398			607		
Prairie-grass fnc'd, tons	90,296	14,465	115,720.00	86,154	10,507	89,309.50
Totals............	250,458	....	$1,545,924.55	235,087	....	$1,337,316.22

Corn on hand March 1, 1911, 426,080 bushels; March 1, 1912, 253,987 bushels.
Wheat on hand March 1, 1911, 10,957 bushels; March 1, 1912, 6660 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—CRAWFORD COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops.......................acres	250,458	$1,545,924.55	235,087	$1,337,316.22
Animals slaughtered and sold for slaughter....	....	622,083.00	....	504,052.00
Poultry and eggs sold..................	....	155,504.00	....	130,751.00
Wool clip.........................lbs.	11,247	1,911.99	7,647	1,529.40
Cheese............................lbs.	457	59.41	1,270	177.80
Butter............................lbs.	618,045	167,089.34	620,520	166,263.24
Milk sold.........................	....	67,425.00	....	53,912.00
Honey and beeswax.................lbs.	4,956	745.40	3,819	574.45
Wood marketed......................	....	2,335.00	....	1,409.00
Totals..........................	....	$2,563,027.69	....	$2,195,985.11

LIVE STOCK.—CRAWFORD COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses....................	12,798	$1,446,174.00	12,237	$1,382,781.00	430	325
Mules and asses............	2,606	341,386.00	2,790	365,490.00	39	39
Milch cows.................	9,121	364,840.00	10,120	455,400.00	325	159
Other cattle...............	13,095	353,565.00	11,015	352,490.00	300	210
Sheep.....................	3,557	14,939.40	3,595	15,278.75	113	179
Swine.....................	21,750	217,500.00	17,512	175,120.00	1,061	3,313
Totals....................	62,927	$2,738,404.40	57,269	$2,746,549.75	2,268	4,225

Number of dogs in county March 1, 1911, 3487; March 1, 1912, 2971.
Number of sheep killed by dogs, year ending March 1, 1911, 38; March 1, 1912, 12.
Number of sheep killed by wolves, year ending March 1, 1911, 4.

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DECATUR COUNTY.

Organized in 1880; area, 900 square miles; population, 7268; rank in population, 74; assessed valuation, $10,815,908; miles of railroad, main track, 56.54; county seat, Oberlin, population, 894.

POPULATION AND VALUATION.—Decatur County.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......		8,114		7,268	$6,236,680	$899,760	$1,682,530	$1,996,938	$10,815,908
Allison tp.........		307		284	$279,080	....	$59,100	$334	$338,514
Altory tp.........		224		187	283,590	$6,500	71,410	157,867	519,367
Bassettville tp.....		198		155	172,160	....	23,180	656	195,996
Cedar Bluffs......	*....	340	102	316	266,800	18,420	77,860	170,402	533,482
Beaver tp.........	340		214						
Center tp.........		207		188	249,360	....	18,740	170,480	438,580
Cook tp...........		176		126	211,120	....	6,750	....	217,870
Custer tp.........		185		174	247,660	....	17,390	430	265,480
Dresden..........	209	479	141	384	232,210	33,590	117,520	375,024	758,344
Dresden tp........	270		243						
Finley tp.........		389		363	259,960	13,210	49,920	92,196	415,286
Kanona..........	64	253	65	272	287,830	....	44,790	23,403	356,023
Garfield tp........	189		207						
Grant tp..........		293		276	267,770	....	33,510	620	301,900
Harlan tp.........		237		194	264,290	....	45,150	161	309,601
Jennings.........	237	497	210	450	....	78,340	108,490	35,586	222,416
Jennings tp.......	260		240		227,460	....	50,210	166,411	444,081
Liberty tp........		190		162	273,420	....	18,840	1,108	293,368
Norcatur.........	446	737	437	703	....	166,050	207,820	33,898	407,768
Lincoln tp........	291		266		298,930	....	33,360	106,074	438,364
Logan tp.........		216		195	220,570	....	36,830	66,397	323,797
Lyon tp..........		274		201	226,960	....	20,930	179,200	427,090
Oberlin..........	1,036	1,302	894	1,159	....	581,170	369,040	43,686	993,896
Oberlin tp........	266		265		293,340	....	43,630	1,272	338,242
Olive tp..........		268		269	278,160	....	26,060	10,492	314,712
Pleasant Valley tp.		285		274	265,060	2,480	27,800	359,038	654,378
Prairie Dog tp....		178		140	237,550	....	20,420	523	258,493
Roosevelt tp......		231		186	199,240	....	23,840	269	223,349
Sappa tp.........		222		211	232,360	....	32,020	982	265,362
Sherman tp.......		214		188	221,830	....	53,540	....	275,370
Summit tp........		212		211	239,970	....	44,380	429	284,779

* Not reported separately from township in 1911.

FARM AND CROP STATISTICS.—Decatur County.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	55,631	111,262	$89,009.60	70,251	281,004	$210,753.00
Spring wheat.......bu.	481	....	....	483	1,952	1,461.00
Corn...............bu.	96,663	....	....	71,961	1,079,415	539,707.50
Oats...............bu.	19,153	....	....	9,660	144,900	59,409.00
Rye................bu.	492	....	....	142	994	695.80
Barley.............bu.	12,809	....	....	4,374	34,992	15,396.48
Emmer ("speltz")..bu.	55	....	....	....	....	....
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	662	....	....	381	22,098	17,678.40
Sweet potatoes......bu.	1	20	25.00	....	....	....
Castor-beans........bu.	....	....	....	1	8	10.00
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco...........lbs.	....	....	....	....	....	....
Broom-corn........lbs.	15	1,500	75.00	21	7,350	183.75
Millet & hungarian, tons	2,172	2,172	17,376.00	2,561	5,122	25,610.00

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FARM AND CROP STATISTICS.—DECATUR COUNTY.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	18	360	$198.00	137	8,220	$3,863.40
forage or grain..tons	30,841	....	154,205.00	17,138	....	137,104.00
Milo maize........tons	4,074	6,111	48,888.00	5,873	11,746	58,730.00
Kafir-corn........tons	18,620	27,930	223,440.00	16,208	40,520	182,340.00
Jerusalem corn....tons	20	30	240.00	35	87	391.50
Timothy..........tons	....			....		
Clover............tons	....			....		
Blue-grass........tons	....			1		
Alfalfa...........tons	6,986	* 10,557	105,570.00	5,040	† 9,044	67,820.00
Orchard-grass.....tons	....					
Other tame grasses, tons	....			....		
Prairie-grass fnc'd, tons	190,610	565	5,085.00	159,609	693	3,811.50
Totals............	439,303	....	$644,111.60	363,876	....	$1,324,975.33

Corn on hand March 1, 1911, 29,623 bushels; March 1, 1912, 2397 bushels.
Wheat on hand March 1, 1911, 23,244 bushels; March 1, 1912, 276 bushels.

*** Product of 1910. † Product of 1911.**

SUMMARY.—DECATUR COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops...........................acres	**439,303**	**$644,111.60**	**363,876**	**$1,324,975.33**
Animals slaughtered and sold for slaughter....	....	**325,678.00**	....	**249,054.00**
Poultry and eggs sold..........	....	**87,991.00**	....	**60,753.00**
Wool clip..........................lbs.	**10,395**	**1,767.15**	**2,480**	**496.00**
Cheese.............................lbs.	....	....	**180**	**25.20**
Butter.............................lbs.	**146,020**	**85,044.80**	**119,824**	**29,956.00**
Milk sold..........................	....	**47,947.00**	....	**38,233.00**
Honey and beeswax..................lbs.	**5,263**	**789.45**	**2,367**	**355.06**
Wood marketed......................	....	**272.00**	....	**80.00**
Totals.............................	....	**$1,143,601.00**	....	**$1,703,927.58**

LIVE STOCK.—DECATUR COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses.....................	**8,846**	**$999,598.00**	**8,064**	**$911,232.00**	**155**	**318**
Mules and asses............	**1,077**	**141,087.00**	**1,078**	**141,218.00**	**8**	**10**
Milch cows.................	**5,274**	**210,960.00**	**4,371**	**196,695.00**	**64**	**173**
Other cattle...............	**7,994**	**215,838.00**	**4,936**	**157,952.00**	**99**	**229**
Sheep......................	**1,815**	**7,623.00**	**511**	**2,171.75**	....	**2**
Swine......................	**15,861**	**153,610.00**	**8,721**	**87,210.00**	**135**	**354**
Totals.....................	**40,367**	**$1,728,716.00**	**27,681**	**$1,496,478.75**	**461**	**1,081**

Number of dogs in county March 1, 1911, 1435; March 1, 1912, 1221.
Number of sheep killed by dogs, year ending March 1, 1911, 19.
Number of sheep killed by wolves, year ending March 1, 1911, 29.

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DICKINSON COUNTY.

Organized in 1857; area, 851 square miles; population, 25,438; rank in population, 14; assessed valuation, $41,714,437; miles of railroad, main track, 152.96; county seat, Abilene, population, 4331.

POPULATION AND VALUATION.—Dickinson County.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county	25,697	25,438	$21,389,838	$5,480,014	$7,805,948	$7,088,637	$41,714,437
Banner tp.	577	668	$781,598	$27,639	$223,903	$175,015	$1,208,155
Buckeye tp.	735	658	1,076,888	28,758	305,028	194,208	1,604,882
Enterprise	800 } 1,561	769 } 1,526	....	367,781	382,508	38,285	788,569
Center tp.	761	757	879,723	20,765	167,529	679,701	1,747,718
Cheever tp.	531	543	936,976	4,675	172,815	3,146	1,117,612
Manchester	250 } 689	242 } 661	....	94,468	62,610	52,055	209,133
Flora tp.	439	419	795,394	....	145,474	368,239	1,309,107
Flagrant Hill tp.	536	540	745,060	....	217,417	4,085	966,562
Garfield tp.	520	498	942,771	....	231,455	1,456	1,175,682
Abilene	4,370 } 5,197	4,331 } 5,230	....	2,760,530	1,499,912	255,882	4,516,324
Grant tp.	827	899	1,275,371	38,840	281,509	846,192	2,441,912
Hayes tp.	572	608	768,486	....	139,503	18,030	921,019
Holland tp.	489	494	666,179	38,731	111,174	258,645	1,074,729
Hope	567 } 1,078	566 } 1,089	....	166,982	202,039	29,462	398,483
Hope tp.	511	523	912,804	....	216,936	355,688	1,485,428
Jefferson tp.	597	441	949,437	8,651	241,450	110,867	1,310,405
Woodbine	242 } 713	270 } 792	....	81,007	162,507	18,394	261,908
Liberty tp.	471	522	1,110,440	....	272,279	200,867	1,583,586
Solomon	1,012 } 1,532	1,035 } 1,553	....	329,345	230,805	83,943	644,093
Lincoln tp.	520	518	956,190	....	148,955	810,597	1,915,742
Logan tp.	647	661	875,557	34,942	242,302	322,327	1,475,128
Herington	4,120 } 4,802	3,905 } 4,534	....	1,122,465	387,320	302,758	1,812,543
Lyon tp.	682	629	799,372	7,100	158,205	868,342	1,833,019
Newbern tp.	665	659	907,658	....	195,900	5,806	1,109,364
Chapman	803 } 1,238	866 } 1,250	....	319,889	258,637	45,035	623,561
Noble tp.	435	384	849,260	....	139,351	325,806	1,314,417
Ridge tp.	583	597	925,805	7,791	152,346	373,863	1,459,805
Rinehart tp.	459	482	878,747	....	219,129	1,822	1,099,698
Sherman tp.	512	491	746,058	....	146,419	1,199	893,676
Union tp.	478	472	910,506	....	177,604	203,040	1,291,150
Wheatland tp.	439	448	817,135	....	142,596	2,121	961,852
Willowdale tp.	547	548	887,423	19,705	170,336	81,761	1,159,225

FARM AND CROP STATISTICS.—Dickinson County.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat........bu.	87,752	1,316,280	$1,158,326.40	94,658	1,514,528	$1,257,058.24
Spring wheat........bu.	210	2,982	2,451.12	46	690	572.70
Corn................bu.	125,553	2,008,848	1,084,777.92	105,535	2,110,700	1,189,778.00
Oats................bu.	39,144	665,448	266,179.20	33,860	948,080	360,270.40
Rye.................bu.	308	4,620	3,927.00	556	10,008	7,005.60
Barley..............bu.	240	3,600	1,800.00	62	1,550	651.00
Emmer ("speltz")..bu.	28	476	218.96	5	135	60.75
Buckwheat..........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	1,085	21,700	20,615.00	1,110	98,790	74,092.50
Sweet potatoes......bu.	182	18,200	18,200.00	8	800	720.00
Castor-beans........bu.	....	....	....	5	50	50.00
Cotton..............lbs.	....	....	....	....	....	....
Flax................bu.	....	....	....	5	35	52.50
Tobacco.............lbs.	....	....	....	....	....	....
Broom-corn.........lbs.	32	12,800	896.00	....	....	....

FARM AND CROP STATISTICS.—DICKINSON COUNTY.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Millet & hungarian, tons	1,724	2,586	$18,102.00	1,174	2.348	$11,740.00
Sugar-beets.......tons	1	4	20.00	....	....	....
Sorghum for—						
syrup or sugar...gals.	150	10.500	5,250.00	1	70	33 60
forage or grain..tons	3,171	....	31,710.00	4,491	....	49,401.00
Milo maize........tons	83	166	996.00	419	1,047	5,758.50
Kafir-corn........tons	5,204	15,612	93,672.00	7,969	23,907	119,585.00
Jerusalem corn....tons	8	24	144.00	10	30	150.00
Timothy..........tons	68	* 46,115	461,150.00	33	† 27,116	271,160.00
Clover...........tons	....			3		
Blue-grass........tons	707			83		
Alfalfa...........tons	27,449			28,416		
Orchard-grass.....tons	227			349		
Other tame grasses, tons	161			102		
Prairie-grass fnc'd, tons	161,901	22,223	200.007.00	152,424	14,085	119,297.50
Totals.............	455,388	....	$3,368,442.60	431.324	....	$3,417,387.29

Corn on hand March 1, 1911, 775,231 bushels; March 1, 1912, 370,888 bushels.
Wheat on hand March 1, 1911, 61,828 bushels; March 1, 1912, 56,663 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—DICKINSON COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops............................acres	455,388	$3,368,442.60	431,324	$3,417,387.29
Animals slaughtered and sold for slaughter....	....	1,358,785.00	....	1,248,429.00
Poultry and eggs sold........................	....	221,565.00	....	197,319.00
Wool clip................................lbs.	11,154	1,896.18	6,686	1,337.20
Cheese...................................lbs.	....	....	20	2.80
Butter...................................lbs.	2,541,435	750,607.32	2,273,667	650,639.05
Milk sold...................................	....	212,120.00	....	237,350.00
Honey and beeswax.......................lbs.	21,174	3,194.80	5,962	929.60
Wood marketed..............................	....	1,460.00	....	951.00
Totals.....................................	....	$5,913,070.90	....	$5,754,344.94

LIVE STOCK.—DICKINSON COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses......................	15,574	$1,759,862.00	15,543	$1,756,359.00	216	308
Mules and asses.............	2,109	276,279.00	2,462	322,522.00	8	17
Milch cows..................	14,224	568,960.00	17,335	780,075.00	157	168
Other cattle................	32,990	890,730.00	30,940	990,080.00	859	576
Sheep.......................	3,752	15,758.40	2,120	9,010.00	82	30
Swine.......................	44,207	442,070.00	33,630	336,300.00	1.553	14,573
Totals.................	112.856	$3.958.659.40	102,030	$4,194,346.00	2,875	15,672

Number of dogs in county March 1. 1911, 2714; March 1, 1912, 2692.
Number of sheep killed by dogs, year ending March 1, 1911, 9.

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DONIPHAN COUNTY.

Organized in 1855; area, 379 square miles; population, 13,675; rank in population, 49; assessed valuation, $24,522,710; miles of railroad, main track, 97.86; county seat, Troy, population, 1062.

POPULATION AND VALUATION.—DONIPHAN COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county		13,759		13,675	$14,082,606	$1,521,118	$5,581,530	$3,337,461	$24,522,710
Burr Oak tp		850		899	$761,062	....	$201,135	$3,756	$965,953
Troy	1,011	2,529	1,062	2,536	....	$422,035	762,300	74,190	1,258,525
Center tp	1,518		1,474		2,051,097	5,110	345,598	733,153	3,134,958
Highland	823	2,954	692	2,898	....	352,350	315,985	12,955	681,290
White Cloud	546		448		....	123,400	191,430	32,587	347,417
Iowa tp	1,585		1,758		2,833,829	10,393	659,245	493,660	3,997,127
Marion tp		721		728	501,630	27,420	100,540	1,911	631,501
Denton	176	794	198	824	....	52,895	71,060	25,052	149,007
Union tp	618		626		1,736,400	18,810	394,880	299,302	2,444,392
Elwood	643	2,797	631	2,718	....	107,280	6,315	58,752	172,347
Wathena	791		738		....	245,780	194,385	60,545	500,710
Washington tp	1,363		1,349		1,058,504	....	920,682	605,935	2,585,121
Doniphan	158	1,296	183	1,263	....	11,790	8,900	....	20,690
Wayne tp	1,138		1,080		1,806,260	2,040	459,365	220,038	2,486,703
Severance	403	1,818	440	1,809	....	94,910	181,390	19,845	295,645
Leona	138		*...		....	28,265	....	20	28,285
Wolf River tp	1,277		1,369		3,334,824	23,635	768,320	696,260	4,823,539

* Not reported separately from township in 1912.

FARM AND CROP STATISTICS.—DONIPHAN COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	27,996	559,920	$503,928.00	33,345	733,590	$616,215.60
Spring wheat.......bu.	75	1,030	854.70	38	760	638 40
Corn..............bu.	62,730	2,182,820	1,109,066.40	63,614	2,226,490	1,224,569.50
Oats..............bu.	16,613	431,938	172,775.20	17,529	578,457	202,459 95
Rye...............bu.	175	3,325	2,826.25	304	5,472	3,885.12
Barley............bu.	253	5,819	3,200.45	143	4,719	2,123.55
Emmer ("speltz")..bu.	6	150	67.50	....	....	....
Buckwheat.........bu.	1	10	10.00	....	....	....
Irish potatoes.......bu.	1,195	34,655	32,575.70	1,095	114,975	73,584.00
Sweet potatoes......bu.	2	200	250.00	7	791	711.90
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco...........lbs.	....	....	....	....	....	....
Broom-corn........lbs.	8	4,000	260.00	10	7,000	315.00
Millet & hungarian, tons	24	48	336.00	69	138	828.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	8	640	320.00	31	4,185	2,092.50
forage or grain..tons	37	....	407.00	45	....	675.00
Milo maize........tons	....	....	....	3	9	49.50
Kafir-corn........tons	24	96	528.00	66	264	1,320.00
Jerusalem corn....tons	3	12	66.00	2	8	40.00
Timothy..........tons	9,528	* 24,961	299,532.00	7,803	† 21,798	261,576.00
Clover............tons	12,028			6,501		
Blue-grass........tons	13,509			10,209		
Alfalfa...........tons	3,151			5,534		
Orchard-grass.....tons	357			954		
Other tame grasses, tons	1,532			1,777		
Prairie-grass fnc'd, tons	14,910	478	4,780.00	27,794	1,159	11,590.00
Totals	164,160	....	$2,131,783.20	176,873	....	$2,402,674.02

Corn on hand March 1, 1911, 685,866 bushels; March 1, 1912, 690,501 bushels.
Wheat on hand March 1, 1911, 47,620 bushels; March 1, 1912, 56,075 bushels.

* Product of 1910. † Product of 1911.

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SUMMARY.—DONIPHAN COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops.........................acres	164,160	$2,131,783.20	176,873	$2,402,674.02
Animals slaughtered and sold for slaughter....	....	853,178.00	....	844,141.00
Poultry and eggs sold........................	....	79,906.00	....	88,696.00
Wool clip...................................lbs.	9,680	1,645.60	4,125	827.00
Cheese......................................lbs.	1,775	230.75	....	....
Butter......................................lbs.	188,727	45,294.48	173,779	43,444.75
Milk sold....................................	....	36,842.00	....	36,261.00
Honey and beeswax.........................lbs.	14,581	2,198.85	13,822	2,079.30
Wood marketed................................	....	2,096.00	....	2,098.00
Totals.....................................	....	$3,153,174.88	....	$3,420,221.07

LIVE STOCK.—DONIPHAN COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses......................	7,245	$818,685.00	7,110	$803,480.00	163	271
Mules and asses..............	2,954	386,974.00	2,831	370,861.00	19	30
Milch cows..................	5,650	226,000.00	6,524	293,580.00	85	86
Other cattle.................	9,093	245,511.00	8,295	265,440.00	86	132
Sheep.......................	6,370	26,754.00	2,592	11,016.00	200	69
Swine.......................	29,974	299,740.00	23,863	238,630.00	1,692	13,180
Totals....................	61,286	$2,003,664 00	51,215	$1,982,957 00	2,245	13,768

Number of dogs in county March 1, 1911, 2213; March 1, 1912, 2188.
Number of sheep killed by dogs, year ending March 1, 1911, 22; March 1, 1912, 9.
Number of sheep killed by wolves year ending March 1, 1911, 13.

DOUGLAS COUNTY.

Organized in 1855; area, 469 square miles; population, 25,205; rank in population, 16; assessed valuation, $35,085,751; miles of railroad, main track, 55.09; county seat, Lawrence, population, 12,854.

POPULATION AND VALUATION.—DOUGLAS COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......	24,934	25,205	$13,913,511	$9,110,819	$7,461,330	$4,600,091	$35,085,751
Clinton tp.........	840	815	$1,087,650	$8,455	$170,330	$26,517	$1,292,952
Eudora...........	620 } 1,691	620 } 1,710	....	284,759	207,790	44,210	536,759
Eudora tp.........	1,071	1,090	1,776,415	....	341,140	416,488	2,534,043
Grant tp..........	502	516	850,080	....	139,720	716,062	1,705,862
Kanwaka tp......	829	836	1,020,180	....	183,460	116,615	1,320,255
Lecompton.......	381 } 1,139	395 } 1,142	....	126,140	81,845	91,890	299,875
Lecompton tp.....	758	747	759,170	740	131,850	670,188	1,561,948
Marion tp.........	1,147	1,124	1,752,550	....	420,605	391	2,173,546
Baldwin..........	1,187 } 2,792	1,265 } 2,873	....	826,610	374,830	36,916	1,238,356
Palmyra tp.......	1,605	1,608	2,370,620	16,740	463,155	645,477	3,495,992

POPULATION AND VALUATION.—DOUGLAS COUNTY.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
Wakarusa tp......	2,235	2,182	$2,884,271	$45,915	$600,795	$1,097,970	$4,628,951
Willow Springs tp..	1,159	1,153	1,412,575	....	246,570	42	1,659,187
Lawrence:							
1st ward........	3,045 } 12,600	3,083 } 12,854	....	7,501,460	4,099,240	737,325	12,638,025
2d ward........	3,036	3,201					
3d ward........	3,197	3,360					
4th ward........	1,359	1,239					
5th ward........	1,111	1,110					
6th ward........	852	861					

FARM AND CROP STATISTICS.—DOUGLAS COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	29,419	529,542	$455,406.12	37,246	981,150	$838,085.00
Spring wheat.......bu.	165	1,650	1,309 50	....	....	....
Corn...............bu.	63,446	1,268,920	774,041.20	61,687	1,910,747	1,165,555.67
Oats...............bu.	13,272	185,808	74,323.20	6,387	255,480	97,082.40
Rye................bu.	124	2,232	1,897.20	491	11,293	8,469.75
Barley.............bu.	48	960	528.00	....	....	....
Emmer ("speltz")..bu.	....	....	....	....	....	....
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	1,670	90,180	77,554.80	1,419	167,442	98,790.78
Sweet potatoes......bu.	57	5,700	5,187.00	102	18,260	10,608.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	1,392	6,960	12,180.00	576	4,608	6,912.00
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	....	....	....	....	....	....
Millet & hungarian, tons	393	786	5,109.00	351	702	3,861.00
Sugar-beets.......tons	....	....	....	2	20	100.00
Sorghum for—						
syrup or sugar...gals.	38	2,850	1,282.50	61	4,270	1,921.50
forage or grain..tons	1,231	....	18,465.00	1,652	....	24,780.00
Milo maize........tons	29	116	638.00	36	126	630.00
Kafir-corn........tons	1,278	5,112	28,116.00	4,518	18,052	81,234.00
Jerusalem corn....tons	36	144	792.00	....	....	....
Timothy..........tons	11,437	* 24,883	298,596.00	7,762	† 9,689	101,734.50
Clover............tons	7,121			3,526		
Blue-grass........tons	4,552			5,723		
Alfalfa...........tons	5,044			6,548		
Orchard-grass.....tons	28			....		
Other tame grasses, tons	227			78		
Prairie-grass fnc'd, tons	79,880	11,419	102,771.00	70,244	4,310	36,635.00
Totals.............	220,882	....	$1,858,196.52	208,349	....	$2,476,849.60

Corn on hand March 1, 1911, 485,457 bushels; March 1, 1912, 380,690 bushels.
Wheat on hand March 1, 1911, 34,232 bushels; March 1, 1912, 26,735 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—DOUGLAS COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops....acres	220,882	$1,858,196.52	208,349	$2,476,349.60
Animals slaughtered and sold for slaughter....	....	706,991.00	....	546,469.00
Poultry and eggs sold....	....	137,152.00	....	102,378.00
Wool clip....lbs.	7,878	1,338.41	11,080	2,206.00
Cheese....lbs.	1,700	221.00	....	....
Butter....lbs.	381,967	92,752.08	387,279	98,259.75
Milk sold....	....	98,284.00	....	94,908.00
Honey and beeswax....lbs.	11,798	1,771.90	2,978	446.15
Wood marketed....	....	1,203.00	....	368.00
Totals....	....	$2,897,909.91	....	$3,321,374.50

LIVE STOCK.—DOUGLAS COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses....	10,271	$1,160,623.00	10,147	$1,146,611.00	200	229
Mules and asses....	1,758	230,298.00	1,658	217,198.00	23	14
Milch cows....	8,420	336,800.00	9,010	405,450.00	168	119
Other cattle....	12,754	344,358.00	10,339	330,848.00	153	183
Sheep....	5,822	24,452.40	3,849	16,358.25	236	571
Swine....	28,522	285,220.00	24,601	246,010.00	851	5,571
Totals....	67,547	$2,381,751.40	59,604	$2,362,475.25	1,631	6,687

Number of dogs in county March 1, 1911, 2676; March 1, 1912, 2779.
Number of sheep killed by dogs, year ending March 1, 1911, 20; March 1, 1912, 17.
Number of sheep killed by wolves year ending March 1, 1911, 12; March 1, 1912, 25.

EDWARDS COUNTY.

Organized in 1874; area, 612 square miles; population, 7156; rank in population, 75; assessed valuation, $15,315,342; miles of railroad, main track, 37.60; county seat, Kinsley, population, 1564.

POPULATION AND VALUATION.—EDWARDS COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county....		7,192		7,156	$9,358,557	$1,208,838	$2,949,664	$1,803,288	$15,315,342
Belpre....	485	886	398	910	....	$187,689	$217,372	$35,141	$440,202
Belpre tp....	401		512		$1,123,219	....	172,398	348,920	1,644,532
North Brown tp....		365		372	742,490	....	112,780	....	855,220
South Brown tp....		651		637	1,015,015	....	189,748	2,312	1,207,075
Franklin tp....		585		604	1,026,714	....	311,894	....	1,338,608
Jackson tp....		413		416	1,020,877	....	140,995	1,790	1,163,662
Kinsley....	1,605	2,117	1,564	2,073	....	768,717	681,242	139,961	1,589,920
Kinsley tp....	512		509		998,459	4,407	156,618	533,039	1,692,523
Lincoln tp....		586		592	985,752	....	231,210	....	1,216,962
Logan tp....		249		239	561,755	....	99,122	745	661,622
Trenton tp....		396		399	964,669	27,496	229,910	337,651	1,559,726
Lewis....	557	945	545	914	....	215,530	279,858	29,606	524,994
Wayne tp....	388		369		919,607	....	126,572	374,118	1,420,297

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FARM AND CROP STATISTICS.—EDWARDS COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	108,444	1,301,328	$1,093,115.52	123,048	1,599,624	$1,263,702.96
Spring wheat.......bu.	....	....	....	5	60	47.40
Corn...............bu.	42,204	633,060	353,713.60	70,457	1,479,597	739,798.50
Oats...............bu.	10,916	174,656	69,862.40	13,262	384,598	153,839.20
Rye................bu.	307	2,763	2,210.40	191	2,865	2,034.15
Barley.............bu.	10,086	171,462	85,731.00	3,365	94,220	42,399.00
Emmer ("speltz")..bu.	15	180	82.80	....	....	....
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	164	2,460	3,075.00	147	9,555	8,599.50
Sweet potatoes......bu.	....	....	....	2	170	161.50
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco...........lbs.	....	....	....	....	....	....
Broom-corn........lbs.	....	....	....	....	....	....
Millet & hungarian, tons	263	263	1,710.00	166	332	1,660.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	20	1,300	650.00	....	....	....
forage or grain..tons	5,376	....	37,632.00	3,580	....	39,380.00
Milo maize........tons	40	80	480.00	351	877	4,385.00
Kafir-corn........tons	6,643	15,500	77,500.00	9,263	27,789	138,945.00
Jerusalem corn....tons	....	....	....	102	306	1,530.00
Timothy...........tons	....	* 2,969	29,690.00	....	† 3,644	32,796.00
Clover............tons	....			....		
Blue-grass........tons	....			....		
Alfalfa...........tons	2,947			3,143		
Orchard-grass.....tons	....			....		
Other tame grasses, tons	....			20		
Prairie-grass fnc'd, tons	71,387	1,803	14,424.00	66,342	2,037	14,259.00
Totals.............	258,812	....	$1,769,876.72	293,444	....	$2,443,537.21

Corn on hand March 1, 1911, 132,428 bushels; March 1, 1912, 148,525 bushels.
Wheat on hand March 1, 1911, 339,976 bushels; March 1, 1912, 84,916 bushels.

*** Product of 1910. † Product of 1911.**

SUMMARY.—EDWARDS COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops............acres	258,812	$1,769,876.72	293,444	$2,443,537.21
Animals slaughtered and sold for slaughter....	....	118,167.00	....	146,679.00
Poultry and eggs sold..........	....	39,749.00	....	40,281.00
Wool clip............lbs.	50	8.50	....	....
Cheese...............lbs.	....	....	100	14.00
Butter...............lbs.	105,559	25,334.16	110,697	27,674.25
Milk sold..............	....	18,514.00	....	21,402.00
Honey and beeswax.......lbs.	....	....	20	3.00
Wood marketed..........	....	6.00	....	....
Totals..............	....	$1,971,655.38	....	$2,679,590.46

LIVE STOCK.—EDWARDS COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	6,937	$783,881.00	7,098	$802,074.00	169	232
Mules and asses	2,314	303,184.00	2,482	325,142.00	16	25
Milch cows	4,022	160,880.00	4,447	200,115.00	54	82
Other cattle	4,880	131,760.00	5,511	176,352.00	113	266
Sheep	13	54.60	37	157.25	....	....
Swine	5,186	51,860.00	5,964	59,640.00	80	906
Totals	23,352	$1,431,569.60	25,539	$1,563,480.25	432	1,511

Number of dogs in county March 1, 1911, 906; March 1, 1912, 918.

ELK COUNTY.

Organized in 1875; area, 651 square miles; population, 9146; rank in population, 70; assessed valuation, $13,847,667; miles of railroad, main track, 63.86; county seat, Howard, population, 1040.

POPULATION AND VALUATION.—ELK COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county		10,017		9,146	$6,985,950	$1,130,170	$2,847,190	$2,884,357	$13,847,667
Elk Falls	283	907	296	890	....	$56,155	$61,340	$28,584	$146,079
Elk Falls tp	624		594		$621,765	....	172,025	463,878	1,257,668
Grenola	533	1,173	473	1,033	....	142,520	168,335	27,989	338,844
Greenfield tp	640		560		722,257	....	241,145	382,755	1,346,157
Howard	1,008	1,859	1,040	1,990	....	468,935	433,795	45,575	948,305
Howard tp	851		950		1,010,325	....	248,255	321,511	1,580,091
Liberty tp		557		362	450,132	2,210	89,085	88,288	629,715
Longton	551	997	464	911	....	181,305	140,350	111,084	432,739
Longton tp	446		447		404,703	....	112,785	244,297	761,785
Oak Valley	*....	691	*	500	470,242	12,940	102,575	502,317	1,088,074
Oak Valley tp	691		500						
Painterhood tp		415		388	459,004	....	85,890	68,166	613,060
Paw Paw tp		789		705	725,942	....	192,835	231,638	1,150,415
Union Center tp		1,086		1,048	1,464,213	....	296,425	1,420	1,762,058
Moline	803	1,543	605	1,319	....	266,105	318,735	69,464	654,304
Wild Cat tp	740		714		657,367	....	183,615	297,391	1,138,373

*** Not reported separately from township in 1911 or 1912.**

FARM AND CROP STATISTICS.—ELK COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	5,269	89,573	$76,187.05	4,440	66,600	$58,608.00
Spring wheat.......bu.	....	....	....	....	....	....
Corn...............bu.	47,718	572,616	343,848.44	37,302	447,624	268,574.40
Oats...............bu.	11,548	150,124	58,548.36	3,642	112,902	40,644.72
Rye................bu.	18	270	224.10	2	38	27.74
Barley.............bu.	....	....	....	....	....	....
Emmer ("speltz")..bu.	15	270	121.50	....	....	....
Buckwheat..........bu.	....	....	....	1	10	10.00
Irish potatoes.......bu.	322	4,508	4,508.00	408	22,848	18,735.36
Sweet potatoes......bu.	1	48	60.00	....	....	....
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	2,545	10,180	17,815.00	407	2,085	3,052.50
Tobacco............lbs.	....	....	....	15	9,000	900.00
Broom-corn........lbs.	65	26,000	1,690 00	70	31,500	1,260.00
Millet & hungarian, tons	283	566	3,396.00	341	511	2,810.50
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	286	17,160	7,722.00	337	23,590	11,795.00
forage or grain..tons	3,763	....	33,867.00	5,291	....	44,978.50
Milo maize........tons	160	320	1,920.00	66	132	726.00
Kafir-corn........tons	15,711	47,133	259,232.00	28,268	56,526	282,630.00
Jerusalem corn....tons	....	....	....	....	....	....
Timothy..........tons	1,334	* 1,644	16,440.00	454	† 12,080	102,680.00
Clover............tons	6,354			930		
Blue-grass........tons	874			241		
Alfalfa...........tons	9,625			8,357		
Orchard-grass.....tons	32			44		
Other tame grasses, tons	772			284		
Prairie-grass fnc'd, tons	182,124	20,188	141,281.00	133,678	19,837	138,859.00
Totals.............	288,819	....	$960,805.45	224,573	....	$976,286.72

Corn on hand March 1, 1911, 61,739 bushels; March 1, 1912, 51,416 bushels.
Wheat on hand March 1, 1911, 290 bushels; March 1, 1912, 5924 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—ELK COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops..............................acres	288,819	$960,805.45	224,573	$976,286.72
Animals slaughtered and sold for slaughter....	....	1,139,947.00	....	857,483.00
Poultry and eggs sold........................	....	98,166.00	....	84,737.00
Wool clip..............................lbs.	2,400	408.00	....	....
Cheese.................................lbs.	....	....	15	2.10
Butter.................................lbs.	157,851	37,884.24	146,152	36,538.00
Milk sold..................................	....	84,581.00	....	71,291.00
Honey and beeswax......................lbs.	2,440	367.70	792	118.80
Wood marketed..............................	....	395.00	....	....
Totals.....................................	....	$2,322,504.39	....	$2,026,456.62

LIVE STOCK.—ELK COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	8,182	$918,916.00	8,154	$921,402.00	152	181
Mules and asses	2,441	319,771.00	2,713	355,403.00	19	25
Milch cows	6,673	266,920.00	7,988	359,460.00	111	133
Other cattle	18,955	511,785.00	21,594	691,008.00	357	754
Sheep	1,363	5,724.60	1,108	4,687.75	12	32
Swine	21,113	211,130.00	15,913	159,130.00	291	909
Totals	58,677	$2,234,246.60	57,465	$2,491,090.75	942	1,984

Number of dogs in county March 1, 1911, 1753; March 1, 1912, 1392.
Number of sheep killed by dogs, year ending March 1, 1911, 8.
Number of sheep killed by wolves, year ending March 1, 1911, 3; March 1, 1912, 2.

ELLIS COUNTY.

Organized in 1867; area, 900 square miles; population, 12,239; rank in population, 55; assessed valuation, $18,385,570; miles of railroad, main track, 32.05; county seat, Hays, population, 1976.

FARM AND CROP STATISTICS.—ELLIS COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat . . . bu.	78,170	156,340	$129,762.20	157,908	1,894,896	$1,478,018.88
Spring wheat . . . bu.	58					
Corn . . . bu.	42,617	85,234	57,959.12	39,954	759,126	325,110.56
Oats . . . bu.	5,247			11,468	275,232	107,340.48
Rye . . . bu.	69			150	1,800	1,278.00
Barley . . . bu.	4,810			704	14,080	5,632.00
Emmer ("speltz") . . bu.						
Buckwheat . . . bu.				10	80	80.00
Irish potatoes . . . bu.	946			676	32,448	26,282.88
Sweet potatoes . . . bu.						
Castor-beans . . . bu.						
Cotton . . . lbs.						
Flax . . . bu.	5					
Tobacco . . . lbs.	35	17,500	1,750.00	26	10,400	1,040.00
Broom-corn . . . lbs.						
Millet & hungarian, tons	2,055	2,055	16,440.00	1,370	2,740	13,700.00
Sugar-beets . . . tons						
Sorghum for—						
syrup or sugar . . . gals.				35	2,450	1,200.50
forage or grain . . tons	4,644		23,220.00	12,227		122,270.00
Milo maize . . . tons	35	35	263.00	90	225	1,237.50
Kafir-corn . . . tons	10,956	10,956	76,692.00	21,574	64,722	323,610.00
Jerusalem corn . . . tons	48	48	336.00	30	90	450.00
Timothy . . . tons		* 11,296	124,256.00		† 2,943	23,544.00
Clover . . . tons						
Blue-grass . . . tons	4					
Alfalfa . . . tons	2,621			2,285		
Orchard-grass . . . tons	15					
Other tame grasses, tons	5					
Prairie-grass fnc'd, tons	213,881	3,497	34,970.00	201,552	2,702	16,212.00
Totals	366,221		$465,648.32	450,059		$2,447,006.80

Corn on hand March 1, 1911, 81,677 bushels; March 1, 1912, 2757 bushels.
Wheat on hand March 1, 1911, 457,845 bushels; March 1, 1912, 34,730 bushels.

*** Product of 1910. † Product of 1911.**

POPULATION AND VALUATION.—ELLIS COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county	12,023	12,239	$11,453,440	$1,649,197	$3,612,983	$1,669,950	$18,385,570
Hays	1,899 } 2,398	1,976 } 2,518	....	$966,015	$1,039,712	$92,639	$2,098,366
Big Creek tp	499	542	$1,012,775	....	81,245	403,295	1,497,315
Buckeye tp	459	437	952,824	....	87,733	2,765	1,043,322
Catherine tp	743	755	548,027	24,147	103,033	1,028	676,235
Ellis	1,096 } 1,812	1,240 } 1,908	....	451,908	628,996	164,042	1,244,946
Ellis tp	716	668	1,063,608	....	115,056	207,159	1,385,823
Freedom tp	521	529	635,819	18,852	90,567	680	745,918
Hamilton tp	710	669	763,896	....	147,594	909	912,399
Herzog tp	773	844	548,468	48,990	100,803	576	698,837
Lookout tp	722	739	684,571	19,621	82,279	1,285	787,756
Pleasant Hill tp	685	565	774,206	22,945	450,140	308,064	1,555,355
Saline tp	615	587	1,186,530	....	155,813	1,815	1,344,158
Smoky Hill tp	381	367	503,429	....	69,605	596	573,634
Victoria tp	759	780	654,264	36,450	177,918	275,022	1,143,654
Walker tp	712	711	1,184,190	27,689	176,926	208,480	1,597,285
Wheatland tp	733	830	940,833	32,580	105,563	1,595	1,080,571

SUMMARY.—ELLIS COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops .... acres	366,221	$465,648.82	450,059	$2,447,006.80
Animals slaughtered and sold for slaughter	....	283,334.00	....	248,631.00
Poultry and eggs sold	....	73,445.00	....	54,951.00
Wool clip .... lbs.	6,211	1,055.87	7,000	1,400.00
Cheese .... lbs.	1,585	206.05	680	95.20
Butter .... lbs.	123,375	29,610.00	117,102	29,275.50
Milk sold	....	51,508.00	....	83,331.00
Honey and beeswax .... lbs.	....	....	....	....
Wood marketed	....	9.00	....	....
Totals	....	$904,816.24	....	$2,814,690.50

LIVE STOCK.—ELLIS COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	12,594	$1,423,122.00	12,576	$1,421,088.00	407	654
Mules and asses	897	117,507.00	877	114,887.00	2	18
Milch cows	8,482	837,280.00	7,272	827,240.00	82	245
Other cattle	14,767	398,709.00	9,692	810,144.00	371	820
Sheep	827	3,473.40	530	2,252.50	2	....
Swine	8,728	87,280.00	5,607	56,070.00	831	1,018
Totals	46,245	$2,367,371.40	36,554	$2,231,681.50	1,695	2,745

Number of dogs in county March 1, 1911, 2042; March 1, 1912, 2071.

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ELLSWORTH COUNTY.

Organized in 1867; area, 720 square miles; population, 9929; rank in population, 68; assessed valuation, $25,158,661; miles of railroad, main track, 88.76; county seat, Ellsworth, population, 1805.

POPULATION AND VALUATION.—Ellsworth County.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......		10,276		9,929	$14,373,402	$2,055,000	$5,337,460	$3,392,799	$25,158,661
Ash Creek tp......		203		156	$574,967	....	$92,370	$82,016	$749,353
Black Wolf tp.....		339		308	807,062	....	208,610	396,960	1,412,632
Carneiro tp.......		279		305	367,833	$5,580	198,370	356 139	927,922
Clear Creek tp....		377		349	583,953	....	210,190	323,265	1,117,408
Columbia tp.......		377		375	1,058,304	....	131,140	2,759	1,192,203
Ellsworth.........	1,889	2,938	1,805	2,728		1,052,540	1,248,320	....	2,300,860
Kanopolis.........	521		445			180,720	111,100	....	291,820
Ellsworth tp......	528		478		971,390	....	292,760	474,804	1,738,954
Empire tp.........		593		591	1,636,381	....	334,120	83,071	2,053,572
Garfield tp........		196		200	387,518	....	120,640	1,889	510,047
Lorraine..........	*....	525	201	543	1,181,405	....	284,830	418,867	1,937,432
Green Garden tp..	525		342						
Langley tp........		433		362	483,213	52,330	110,450	242,952	845,965
Lincoln tp........		225		226	697,130	9,350	126,470	183,360	1,006,960
Mulberry tp.......		216		207	371,261	....	157,290	996	529,547
Noble tp..........		450		450	745,490	....	106,260	89,516	941,266
Palacky tp........		371		362	851,162	....	182,080	2,969	1,036,211
Sherman tp.......		376		349	801,420	....	143,020	2,969	947,409
Thomas tp........		208		229	745,120	....	90,210	305,057	1,140,387
Holyrood.........	431	753	445	774	....	199,000	237,600	....	436,600
Valley tp..........	322		329		1,093,750	....	181,590	103,807	1,379,147
Wilson...........	1,029	1,417	1,029	1,415	....	550,190	657,500	....	1,207,690
Wilson tp.........	388		386		1,016,043	5,290	112,540	321,403	1,455,276

* Not reported separately from township in 1911.

FARM AND CROP STATISTICS.—Ellsworth County.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	105,196	736,372	$625,915.60	119,438	2,030,446	$1,563,443.42
Spring wheat.......bu.	88	352	281.60	11	165	127.05
Corn...............bu.	54,244	379,708	246,810.20	48,666	1,021,986	582,532.02
Oats...............bu.	9,538	47,690	21,937.40	11,271	293,046	123,079.32
Rye................bu.	205	820	656.00	260	4,420	3,094.00
Barley.............bu.	527	2,635	1,449.25	354	8,850	3,894.00
Emmer ("speltz")..bu.	182	910	455.00	56	1,232	591.36
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	594	7,128	7,912.08	496	30,256	24,507.36
Sweet potatoes......bu.	6	240	288 00	4	332	332.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco...........lbs.	....	....	....	....	....	....
Broom-corn........lbs.	....	....	....	18	9,000	360.00
Millet & hungarian, tons	251	251	2,008.00	179	358	1,790.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	2	120	60.00	269	18,830	9,415.00
forage or grain..tons	7,767	....	62,136.00	8,327	....	83,270.00
Milo maize........tons	....	....	....	14	35	175.00

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FARM AND CROP STATISTICS.—ELLSWORTH COUNTY.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Kafir-corn .... tons	8,169	16,838	$114,366.00	9,968	29,904	$149,520.00
Jerusalem corn.... tons	....	....	....	....	....	....
Timothy.......... tons	....	* 13,192	145,112.00	....	† 6,909	58,726.50
Clover........... tons	....			....		
Blue-grass........ tons	20			14		
Alfalfa........... tons	10,117			8,883		
Orchard-grass..... tons	....			14		
Other tame grasses, tons	3			2		
Prairie-grass fnc'd, tons	187,932	7,751	77,510.00	183.835	2,561	17,927.00
Totals............	384,841	....	$1,306,897.13	392,079	....	$2,622,784.03

Corn on hand March 1, 1911, 331.102 bushels; March 1, 1912, 45.696 bushels.
Wheat on hand March 1, 1911, 230,315 bushels; March 1, 1912, 41,530 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—ELLSWORTH COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops.............................. acres	384,841	$1,306,897.13	392,079	$2,622,784.03
Animals slaughtered and sold for slaughter....	....	1,496,784.00	....	1,099,264.00
Poultry and eggs sold........................	....	109,306.00	....	92,772.00
Wool clip.............................. lbs.	866	147.22	300	60.00
Cheese.................................. lbs.	1,990	258.70	25	3.50
Butter.................................. lbs.	192,132	46,111.68	174,173	43,543.25
Milk sold................................	....	58,167.00	....	49,132.00
Honey and beeswax.................... lbs.	400	60.00	....	....
Wood marketed..........................	....	533.00	....	25.00
Totals..................................	....	$3,018,264.73	....	$3,907,583.78

LIVE STOCK.—ELLSWORTH COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses.....................	9,346	$1,056,098.00	9,865	$1,114,745.00	65	114
Mules and asses............	1,882	246,542.00	1,973	258,463.00	17	15
Milch cows..................	6,911	276,440.00	7,824	352,080.00	22	35
Other cattle................	28,834	778,518.00	22,492	719,744.00	170	186
Sheep......................	80	336.00	162	688.50	2	14
Swine......................	18,867	188,670.00	11,316	113,160.00	1,610	4,832
Totals.....................	65,920	$2,546,604.00	53,632	$2,558,880.50	1,886	5,146

Number of dogs in county March 1, 1911, 1593; March 1, 1912, 1550.
Number of sheep killed by dogs, year ending March 1, 1911, 2.

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FINNEY COUNTY.

Organized in 1884; area, 1296 square miles; population, 6130; rank in population, 77; assessed valuation, $12,613,972; miles of railroad, main track, 59.90; county seat, Garden City, population, 3057.

POPULATION AND VALUATION.—FINNEY COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county	6,756	6,130	$7,093,882	$1,779,789	$1,931,415	$1,808,886	$12,613,972
Garfield tp	735	595	$1,235,105	$3,122	$159,861	$4,488	$1,402,576
Garden City	3,265 } 3,968	3,057 } 3,688	....	1,702,665	1,015,798	228,119	2,946,582
Garden City tp	703	631	1,730,520	8,640	239,798	552,448	2,531,406
Ivanhoe tp	266	233	357,105	1,200	46,810	....	405,115
Pierceville tp	454	361	609,495	12,765	77,308	419,849	1,119,417
Pleasant Valley tp.	143	116	567,345	....	55,469	....	622,814
Sherlock tp	982	923	1,698,602	41,987	187,047	491,462	2,419,098
Terry tp	208	214	895,710	9,410	149,324	112,520	1,166,964

FARM AND CROP STATISTICS.—FINNEY COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	5,862	29,810	$25,206.60	7,820	73,200	$57,096.00
Spring wheat.......bu.	69	194	150.04	62	682	477 40
Corn.......bu.	10,039	100,390	58,226.20	4,807	77,526	42,639.30
Oats.......bu.	6,176	67,936	30,571.20	6,006	126,126	47,927 88
Rye.......bu.	149	745	618.35	55	715	500.50
Barley.......bu.	3,925	43,175	21,587.50	3,493	69,860	29,341.20
Emmer ("speltz")..bu.	739	....	....	398	7,960	8,741.20
Buckwheat.......bu.	....	....	....	....	....	....
Irish potatoes.......bu.	56	1,680	1,680.00	37	1,885	1,696.50
Sweet potatoes......bu.	27	2,700	2,700.00	48	5,760	5,760.00
Castor-beans.......bu.	....	....	....	....	....	....
Cotton.......lbs.	....	....	....	....	....	....
Flax.......bu.	10	....	....	4	24	36.00
Tobacco.......lbs.	....	....	....	....	....	....
Broom-corn.......lbs.	665	199,500	10,972.50	1,143	571,500	17,145.00
Millet & hungarian, tons	2,204	2,204	15,428.00	1,348	2,696	13,480.00
Sugar-beets.......tons	3,768	20,724	103,620.00	5,744	57,440	315,920.00
Sorghum for—						
syrup or sugar...gals.	15	600	300.00	45	3,150	1,512.00
forage or grain..tons	14,956	....	134,604.00	13,423	....	127,518.50
Milo maize.......tons	7,719	15,438	108,066.00	7,456	18,640	93,200.00
Kafir-corn.......tons	5,574	13,006	84,539.00	7,444	18,610	83,745.00
Jerusalem corn....tons	270	630	4,095.00	92	230	1,035.00
Timothy.......tons	....			....		
Clover.......tons	....			....		
Blue-grass.......tons	....			....		
Alfalfa.......tons	10,180	* 22,677	226,770.00	12,139	† 12,044	108,396.00
Orchard-grass.....tons	....			....		
Other tame grasses, tons	....			....		
Prairie-grass fnc'd, tons	128,643	3,335	30,015.00	170,714	1,395	9,765.00
Totals..........	201,046	....	$859,149.39	241,278	....	$960,932.48

Corn on hand March 1, 1911, 4795 bushels; March 1, 1912, 125 bushels.
Wheat on hand March 1, 1911, 2237 bushels; March 1, 1912, 37 bushels.

*** Product of 1910. † Product of 1911.**

SUMMARY.—FINNEY COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops.......acres	201,046	$859,149.39	241,278	$960,982.48
Animals slaughtered and sold for slaughter	....	141,131.00	....	96,939.00
Poultry and eggs sold	....	22,284.00	....	16,944.00
Wool clip.......lbs.	7,000	1,190.00	5,300	1,060.00
Cheese.......lbs.	....	....	700	98.00
Butter.......lbs.	92,906	22,297.44	89,340	22,335.00
Milk sold	....	15,367.00	....	19,339.00
Honey and beeswax.......lbs.	18,866	2,859.90	18,590	2,063.50
Wood marketed	....	....	....	....
Totals	....	$1,064,278.73	....	$1,119,710.98

LIVE STOCK.—FINNEY COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	5,072	$578,136.00	5,085	$568,955.00	171	146
Mules and asses	1,478	192,963.00	1,276	167,156.00	16	11
Milch cows	4,324	172,960.00	4,583	206,235.00	62	61
Other cattle	12,243	330,561.00	9,456	302,592.00	215	214
Sheep	4,175	17,535.00	3,118	13,251.50	....	....
Swine	1,298	12.980.00	1,041	10,410.00	45	708
Totals	28,585	$1,300,135.00	24,509	$1.268,599.50	509	1,140

Number of dogs in county March 1, 1911, 757; March 1, 1912, 721.
Number of sheep killed by wolves year ending March 1, 1911, 25; March 1, 1912, 42.

FORD COUNTY.

Organized in 1873; area, 1080 square miles; population, 11,618; rank in population, 56; assessed valuation, $20,787,781; miles of railroad, main track, 87.37; county seat, Dodge City, population, 3610.

POPULATION AND VALUATION.—FORD COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county		11,141		11.618	$10,890,258	$2.015.201	$3,883.931	$3,998,391	$20,787,781
Bloom tp		217		271	$787,792	$13,660	$118,989	$432,330	$1,352,771
Bucklin	725	950	644	891	....	170,280	252,375	75,941	498,596
Bucklin tp	225		247		407,456	....	97,404	108,009	612,869
Concord tp		274		270	610,292	....	79,622	....	689,914
Dodge City	3,221	3,648	3,610	4,048	....	1,502,255	1,262,100	206,607	2,967,802
Dodge tp	427		438		443,023	2,880	73,521	582,222	1,104,806

POPULATION AND VALUATION.—Ford County.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
Enterprise tp.....		276		176	694,981	....	128,284	166,543	989,805
Fairview tp.......		302		298	568,397	....	71,792	334,596	974,788
Ford............	201	799	235	823	....	61,690	101,884	14,778	177,852
Ford tp...........	598		588		998,278	....	226,768	316,912	1,541,958
Grandview tp.....		992		994	657,471	3,280	120,796	309,146	1,090,698
Pleasant Valley tp.		377		459	742,052	....	176,458	180,383	1,098.893
Richland tp.......		250		270	436,881	....	42,169	....	479,050
Royal tp..........		142		157	471,871	....	43,020	4,374	519,265
Sodville tp........		310		347	424,474	8,014	120,102	273,624	831,214
Spearville........	651	1,717	574	1,728	....	251,106	338,901	85,686	675,693
Spearville tp......	1,066		1,154		2,084,007	....	317,890	567,512	2,969,499
Wheatland tp.....		555		560	856,585	2,036	219,062	334,286	1,411,969
Wilburn tp........		332		331	706,698	....	93,294	442	800,434

FARM AND CROP STATISTICS.—Ford County.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	126,924	761,544	$647,312.40	223,633	3,130,862	$2,348,146.50
Spring wheat.......bu.	54	166	123 80	....	....	....
Corn...............bu.	66,228	728,508	400,679.40	32,880	723,360	361,680.00
Oats...............bu.	27,952	391,328	160,444.48	14,613	453,003	185,731.23
Rye................bu.	835	6,680	5,611.20	338	5,070	3,549.00
Barley.............bu.	19,[illegible]07	254,891	127,445.50	7,922	190,128	91,261.44
Emmer ("speltz")..bu.	685	8,905	4,274.40	2	40	19.20
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	393	9,432	10,658.16	222	17,982	16,183.80
Sweet potatoes......bu.	1	40	50.00	3	240	240.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	15	4,500	270.00	60	24,000	720 00
Millet & hungarian, tons	1,175	1,763	10,578.00	1,330	2,327	11,635.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	10	600	300.00	203	15,225	7,308.00
forage or grain..tons	15,184	....	121,472.00	8,988	....	89,880.00
Milo maize........tons	656	1,312	7,872.00	1,868	4,670	25,685.00
Kafir-corn........tons	17,639	47,037	235,185.00	18,428	55,284	276,420.00
Jerusalem corn....tons	....	....	....	10	30	150.00
Timothy..........tons	....			4		
Clover...........tons	....			....		
Blue-grass........tons	1			....		
Alfalfa...........tons	7,864	* 12,918	116,262.00	6,604	† 20,257	182,313.00
Orchard-grass.....tons	20			76		
Other tame grasses, tons	150			114		
Prairie-grass fnc'd, tons	158,888	2,455	19,640.00	128,305	3,916	27,412.00
Totals.............	444,281	....	$1,868,178.34	445,603	....	$3,628,334.17

Corn on hand March 1, 1911, 90,465 bushels; March 1, 1912, 69,275 bushels.
Wheat on hand March 1, 1911, 327,865 bushels; March 1, 1912, 80,300 bushels.

*** Product of 1910. † Product of 1911.**

SUMMARY.—FORD COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops .... acres	444,281	$1,868,178.34	445,603	$3,628,334.17
Animals slaughtered and sold for slaughter....	....	191,173.00	....	197,396.00
Poultry and eggs sold....................	....	56,193.00	....	65,276.00
Wool clip.............................lbs.	112	19.04	....	....
Cheese................................lbs.	25	3.25	....	....
Butter................................lbs.	123,275	29,586.00	125,090	31,272.50
Milk sold................................	....	47,653.00	....	55,831.00
Honey and beeswax....................lbs.	2,535	382.75	7,662	1,182.60
Wood marketed............................	....	....	....	....
Totals...................................	....	$2,193,188.38	....	$3,979,291.27

LIVE STOCK.—FORD COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses......................	9,556	$1,079,828.00	10,038	$1,134,294.00	236	395
Mules and asses.............	2,178	285,318.00	2,561	335,491.00	11	44
Milch cows..................	5,977	239,080.00	6,819	306,855.00	81	162
Other cattle................	10,115	273,105.00	10,217	326,944.00	150	330
Sheep.......................	26	109.20	87	157.25	2	....
Swine.......................	5,461	54,610.00	4,517	45,170.00	243	1,241
Totals..................	33,313	$1,932,050.20	$31,189	$2,148,911.25	728	2,172

Number of dogs in county March 1, 1911, 1257; March 1, 1912, 1471.
Number of sheep killed by dogs, year ending March 1, 1911, 4.

FRANKLIN COUNTY.

Organized in 1857; area, 576 square miles; population, 21,017; rank in population, 23; assessed valuation, $32,351,929; miles of railroad, main track, 101.41; county seat, Ottawa, population, 7740.

POPULATION AND VALUATION.—FRANKLIN COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......	20,590	21,017	$14,972,910	$5,248,315	$5,119,905	$7,010,799	$32,351,929
Appanoose tp.....	516	507	$683,485	....	$114,335	....	$797,820
Centropolis tp.....	981	986	1,134,770	$19,290	171,770	$245,067	1,570,897
Cutler tp.........	986	978	894,395	38,775	225,585	272,324	1,431,079
Wellsville........	645 } 1,373	660 } 1,390	....	266,260	346,545	18,172	630,977
Franklin tp.......	728	730	1,174,915	19,205	186,940	756,025	2,137,085
Greenwood tp.....	602	605	628,160	....	134,770	375,676	1,134,606
Harrison tp.......	608	615	1,002,500	....	137,280	408,711	1,548,491

POULATION AND VALUATION.—FRANKLIN COUNTY.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
Hayes tp..........	511	515	908,795	2,845	129,510	529,825	1,570,975
Homewood tp.....	737	728	740,830	....	203,930	202,160	1,146,920
Lincoln tp.........	631	640	979,045	10,530	143,655	488,553	1,621,783
Ohio tp............	790	789	1,119,955	50,960	231,775	506,546	1,908,966
Ottawa tp.........	1,071	1,060	1,439,670	....	171,810	1,195,300	2,806,780
Peoria tp..........	683	687	891,475	18,665	174,255	130,338	1,209,733
Pomona...........	530 } 840	547 } 861	....	169,220	104,130	....	273,350
Pomona tp........	310	314	453,965	2,645	80,585	495,587	1,032,512
Lane..............	269 } 909	270 } 907	....	99,290	100,025	35,792	235,107
Pottawatomie tp..	640	637	878,660	....	127,280	286,443	1,287,383
Richmond.........	* .... } 934	340 } 930	....	180,935	126,885	41,655	299,745
Richmond tp......	934	590	823,295	....	92,430	280,311	1,201,036
Williamsburg.....	403 } 1,078	432 } 1,079	....	160,425	140,950	22,911	324,286
Williamsburg tp...	675	647	1,219,265	....	199,385	216,591	1,635,241
Ottawa...........	7,340	7,740	....	4,264,540	1,776,075	506,812	6,547,427

* Not reported separately from township in 1911.

FARM AND CROP STATISTICS.—FRANKLIN COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	10,217	194,123	$168,887.01	18,134	326,412	$283,978.44
Spring wheat.......bu.	14	188	150.80	....	....	....
Corn...............bu.	75,961	1,063,454	648,706.94	77,143	1,928,575	1,118,573.50
Oats...............bu.	20,187	282,618	115,873.38	9,434	339,624	129,067.12
Rye................bu.	262	3,930	3,340.50	569	9,673	7,254.75
Barley.............bu.	82	1,640	902.00	....	....	....
Emmer ("speltz")..bu.	35	525	236.25	....	....	....
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	723	20,967	18,870.30	540	51,840	34,732.80
Sweet potatoes......bu.	1	69	69.69	....	....	....
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	4,453	13,359	24,046.20	1,992	15,936	23,904.00
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	....	....	....	25	18,750	618.75
Millet & hungarian, tons	436	654	4,578.00	752	1,504	7,520.00
Sugar-beets.......tons	....	....	....	20	160	800.00
Sorghum for—						
syrup or sugar...gals.	111	5,550	2,608.50	151	11,325	5,096.25
forage or grain..tons	984	....	11,808.00	1,606	....	19,272.00
Milo maize........tons	48	144	792.00	76	228	1,140.00
Kafir-corn........tons	4,772	16,702	83,510.00	11,882	47,528	190,112.00
Jerusalem corn....tons	30	105	525.00	5	20	80.00
Timothy..........tons	28,290	* 29,714	356,568.00	22,386	† 9,495	104,445.00
Clover............tons	8,301			5,823		
Blue-grass........tons	6,889			4,963		
Alfalfa...........tons	2 114			2,615		
Orchard-grass.....tons	173			462		
Other tame grasses, tons	4,725			4,625		
Prairie-grass fnc'd, tons	126,788	16,750	167,500 00	121,084	6,220	49,760.00
Totals.............	295,596	....	$1,608,972.57	284,287	....	$1,976,344.61

Corn on hand March 1, 1911, 429,463 bushels; March 1, 1912, 97,988 bushels.
Wheat on hand March 1, 1911, 2175 bushels; March 1, 1912, 2040 bushels.

* Product of 1910. † Product of 1911.

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SUMMARY.—FRANKLIN COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops .... acres	295,596	$1,608,972.57	284,287	$1,976,344.61
Animals slaughtered and sold for slaughter....	....	969,251.00	....	1,140,759.00
Poultry and eggs sold........	....	171,261 00	....	163,178.00
Wool clip........ lbs.	6,041	1,026.97	5,138	1,027.60
Cheese........ lbs.	....	....	....	....
Butter........ lbs.	666,152	186,351.06	521.538	144,116.54
Milk sold........	....	126,599.00	....	120,764.00
Honey and beeswax........ lbs.	10,195	1,543.75	3,808	502 20
Wood marketed........	....	295.00	....	376.00
Totals........	....	$3,065,300 85	....	$3,547,067.95

LIVE STOCK.—FRANKLIN COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses........	11,299	$1,276,787.00	10,798	$1,220,174.00	185	100
Mules and asses........	2,111	276,541 00	2,177	285,187.00	10	16
Milch cows........	9,482	379,280 00	10,571	475.695.00	137	84
Other cattle........	17,681	477,387.00	12,014	384 448.00	211	86
Sheep........	2,490	10,458 00	3,108	13,209.00	32	106
Swine........	31,568	315,680.00	27.573	275,780.00	460	1,260
Totals........	74,631	$2,736,133.00	66.241	$2.654,443.00	1,035	1.652

Number of dogs in county March 1, 1911, 2128; March 1, 1912, 2261.
Number of sheep killed by dogs, year ending March 1, 1911, 27.
Number of sheep killed by wolves, year ending March 1, 1911, 13.

GEARY COUNTY.

Organized in 1855; area, 407 square miles; population, 10,074; rank in population, 67; assessed valuation, $17,162,537; miles of railroad, main track, 44.90; county seat, Junction City, population, 5645.

POPULATION AND VALUATION.—GEARY COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......	10.483	10.074	$7,208,525	$3,943,225	$3,801,840	$2,208,947	$17,162,537
Blakely tp........	287	269	$535,710	....	$132,015	$71,157	$738,882
Jackson tp........	228	225	457,020	....	148,310	....	605,330
Jefferson tp........	548	517	851,435	....	189,570	6,397	1,047,402
Liberty tp........	668	659	891,190	....	252 710	....	1,143,900
Lyon tp........	403	431	947.885	....	174,185	211,413	1,333,483
Milford tp........	763	762	1,037,680	$70,815	340,930	169,782	1,619,207
Smoky Hill tp.....	1.189	1,246	1,900,285	.....	521,330	1,413,277	3,834,892
Wingfield........	330	320	587,320		102,065	....	689,385
Junction City.....	6,067	5,645	....	3,872,410	1,940,725	336,921	6,150,056

FARM AND CROP STATISTICS.—GEARY COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	14,419	$278,961	$232,866.85	16,222	210,886	$187,688.54
Spring wheat.......bu.	529	5,809	4,699.29	86	921	797.19
Corn..............bu.	41,821	836,420	444,302 60	39,554	909,742	491,260.68
Oats..............bu.	7,785	147,915	60,645.15	6,587	184,436	78,774.40
Rye...............bu.	93	1,395	1,185.75	96	1,920	1,363.20
Barley............bu.	10	180	99.00	....	....	....
Emmer ("speltz")..bu.	....	....	....	10	260	119.60
Buckwheat.........bu.	....	....	....	2	24	24.00
Irish potatoes.......bu.	759	15,989	16,257.78	410	42,230	31,672.50
Sweet potatoes......bu.	2	138	150.42	4	500	425.00
Castor-beans........bu.	1	10	12.50	....	....	....
Cotton............lbs.	....	....	....	....	....	....
Flax..............bu.	....	....	....	....	....	....
Tobacco...........lbs.	....	....	....	....	....	....
Broom-corn........lbs.	....	....	....	....	....	....
Millet & hungarian, tons	1,170	1,755	11,408.00	1,108	1,385	7,617.50
Sugar-beets.......tons	....	....	....	2	22	110.00
Sorghum for—						
syrup or sugar...gals.	25	2,000	1,000.00	39	2,925	1,374.75
forage or grain..tons	1,104	....	9,936.00	1,659	....	23,226.00
Milo maize........tons	4	12	66.00	49	147	808.50
Kafir-corn........tons	2,890	11,560	57,800.00	4,193	14,675	73,375.00
Jerusalem corn....tons	2	8	40.00	10	35	175.00
Timothy..........tons	22	* 16,132	177,452.00	4	† 11,167	111,670.00
Clover...........tons	17			18		
Blue-grass........tons	61			42		
Alfalfa...........tons	6,675			7,385		
Orchard-grass.....tons	19			14		
Other tame grasses, tons	....			....		
Prairie-grass fnc'd, tons	115,045	12,629	119,975.50	118,551	6,920	58,820.00
Totals.............	192,453	....	$1,137,896.84	191,040	....	$1,064,301.86

Corn on hand March 1, 1911, 335,137 bushels; March 1, 1912, 184,221 bushels.
Wheat on hand March 1, 1911, 19,790 bushels; March 1, 1912, 18,400 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—GEARY COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops..........................acres	192,453	$1,137,896.84	191,040	$1,064,301.86
Animals slaughtered and sold for slaughter....	....	549,489.00	....	668,394.00
Poultry and eggs sold..................	....	59,877 00	....	61,849.00
Wool clip..........................lbs.	1,539	261.63	975	195.00
Cheese.............................lbs.	....	....	30	4.20
Butter.............................lbs.	515,080	145,219.20	732,898	206,647.62
Milk sold..........................	....	37,575 00	....	44,446.00
Honey and beeswax..................lbs.	3,109	467.85	1,206	180.90
Wood marketed......................	....	6,014.00	....	2,269.00
Totals.............................	....	$1,936,800.52	....	$2,048,287 58

LIVE STOCK.—GEARY COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	5,454	$616,302.00	5,430	$613,590.00	49	95
Mules and asses	791	103,621.00	824	107,944.00	4	5
Milch cows	6,007	240,280.00	7,196	323,820.00	28	30
Other cattle	17,661	476,847.00	16,518	528,416.00	205	281
Sheep	284	1,192.80	308	1,309.00	....	....
Swine	13,919	139,190.00	12,168	121,680.00	315	3,443
Totals	44,116	$1,577,482.80	42,439	$1,696,759.00	601	3,854

Number of dogs in county March 1, 1911, 1090; March 1, 1912, 1141.
Number of sheep killed by dogs, year ending March 1, 1911, 4; March 1, 1912, 3.
Number of sheep killed by wolves, year ending March 1, 1912, 2.

GOVE COUNTY.

Organized in 1886; area, 1080 square miles; population, 4516; rank in population, 84; assessed valuation, $8,974,191; miles of railroad, main track, 37.12; county seat, Gove, population, 172.

FARM AND CROP STATISTICS.—GOVE COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	....	....	....	18,132	72,528	$53,670.72
Spring wheat.......bu.	2,846	....	....	687	4,734	3,317.80
Corn...............bu.	48,382	....	....	32,763	458,682	252,275.10
Oats...............bu.	6,716	....	....	10,925	152,950	62,709.50
Rye................bu.	210	....	....	126	1,260	882.00
Barley.............bu.	4,259	....	....	2,252	22,520	9,008.00
Emmer ("speltz")..bu.	10,228	....	....	4,456	53,472	26,736.00
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	265	....	....	137	6,576	5,589.60
Sweet potatoes......bu.	....	....	....	....	....	....
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	15	1,500	$75.00	35	14,000	350.00
Millet & hungarian, tons	3,358	1,679	13,432.00	2,760	6,900	34,500.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	20	400	200.00	....	....	....
forage or grain..tons	35,514	....	177,570.00	37,571	....	338,139.00
Milo maize........tons	4,791	4,791	38,328.00	6,814	17,033	93,692.50
Kafir-corn........tons	10,110	10,110	80,880.00	14,954	44,862	201,879.00
Jerusalem corn....tons	116	116	928.00	107	321	1,605.00
Timothy..........tons	....	* 9,589	115,068.00	....	† 3,078	24,624.00
Clover............tons	....			....		
Blue-grass........tons	1			....		
Alfalfa...........tons	4,088			3,484		
Orchard-grass.....tons	....			....		
Other tame grasses, tons	30			....		
Prairie-grass fnc'd, tons	152,848	968	9,680.00	152,725	794	4,764.00
Totals	283,797	....	$436,161.00	287,928	....	$1,113,742.22

Corn on hand March 1, 1911, 36,725 bushels; March 1, 1912, 710 bushels.
Wheat on hand March 1, 1911, 28,796 bushels; March 1, 1912, 80 bushels.

*** Product of 1910. † Product of 1911.**

POPULATION AND VALUATION.—GOVE COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......		5,640		* 4,516	$5,731,990	$266,919	$1,224,901	$1,750,381	$8,974,191
Quinter..........	415	1,290	272	995	....	$106,935	$197,981	....	$304,866
Baker tp..........	875		723		$918,289	....	137,670	$356,892	1,412,801
Gaeland tp........		305		230	423,238	....	37,370	....	460,608
Gove.............	197	607	172	539	....	35,653	69,065	....	104,718
Gove tp...........	410		367		642,383	....	77,960	1,391	721,734
Grainfield.........	254	581	232	489	....	61,469	123,775	....	185,244
Grainfield tp......	327		257		608,541	....	60,220	397,267	1,066,028
Grinnell..........	*...	665	*...	587	1,002,929	39,246	197,190	654,470	1,893,835
Campus...........	*...		*...						
Grinnell tp........	665		587						
Jerome tp.........		354		301	460,191	3,572	52,780	132	516,675
Larrabee tp.......		453		313	462,866	964	45,915	6	509,751
Lewis tp..........		529		290	337,866	....	33,210	388	371,464
Park.............	*...	856	*...	772	875,737	19,080	191,815	339,835	1,426,467
Payne tp.........	856		772						

* Not reported separately from township in 1911 or in 1912.

SUMMARY.—GOVE COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops.............................acres	283,797	$436,161.00	287,928	$1,118,742.22
Animals slaughtered and sold for slaughter....	....	142,194.00	....	96,190.00
Poultry and eggs sold..........................	....	40,455.00	....	26,277.00
Wool clip.....................................lbs.	1,700	289.00	....	....
Cheese...lbs.	80	10.40	545	76.30
Butter..lbs.	84,051	20,172.24	59,257	14,814.25
Milk sold..	....	16,318.00	....	15,236.00
Honey and beeswax.........................lbs.	....	....	....	....
Wood marketed..................................	....	....	....	....
Totals..	....	$655,599.64	....	$1,266,335.77

LIVE STOCK.—GOVE COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses......................	7,325	$827,725.00	5,930	$670,090.00	159	362
Mules and asses............	1,125	147,375.00	815	106,765.00	10	16
Milch cows..................	3,956	158,240.00	2,793	125,685.00	39	214
Other cattle.................	5,583	150,741.00	2,692	86,144.00	58	323
Sheep........................	294	1,234 80	81	344.25	3	10
Swine........................	4,385	43,850.00	2,110	21,100.00	156	459
Totals......................	22,668	$1,329,165.80	14,421	$1,010,128.25	425	1,384

Number of dogs in county March 1, 1911, 922; March 1, 1912, 728.
Number of sheep killed by wolves, year ending March 1, 1911, 5; March 1, 1912, 5.

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GRAHAM COUNTY.

Organized in 1880; area, 900 square miles; population, 8074; rank in population, 72; assessed valuation, $10,963,231; miles of railroad, main track, 30.40; county seat, Hill City, population, 750.

POPULATION AND VALUATION.—GRAHAM COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......	8.193	8.074	$7,824,247	$559.068	$1,711,077	$868.839	$10,963,231
Allodium tp.......	538	507	$599,125	....	$64,270	$1,980	$665,375
Bryant tp.........	868	815	776,530	$8,845	116,913	1,657	903,945
Gettysburg tp.....	524	523	719,065	....	115,415	205,524	1,040,004
Graham tp........	507	513	617,156	....	138,180	1,521	756,857
Happy tp.........	607	585	758,465	....	77,065	1,756	837,286
Hill City.........	756 } 1,183	750 } 1,182	....	400,950	371,436	5,113	777,499
Hill City tp.......	427	432	457.927	....	92,049	106,424	656,400
Indiana tp........	460	472	595,595	....	87,455	1,400	684,450
Millbrook tp......	605	593	515,742	8,605	69,421	45,369	639,137
Morlan tp........	793	780	890,992	....	110,930	255	1,002,177
Nicodemus........	361	401	290,192	8,163	19,745	608	318,708
Pioneer tp........	505	486	555,294	....	118,725	474	674,493
Morland..........	228 } 684	209 } 659	....	101,515	107,800	3,781	213,096
Solomon tp........	456	450	524.660	....	84,495	192,829	801,984
Wildhorse tp......	558	558	523,504	30,990	137.178	300,148	991,820

FARM AND CROP STATISTICS.—GRAHAM COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	59,530	119,060	$98,819.80	89,586	627,102	$457,784.46
Spring wheat.......bu.	....	....	....	....	....	....
Corn...............bu.	134,739	134,739	94,317.30	102,729	1,335,477	734,512.35
Oats...............bu.	7,641	....	....	14,889	178,668	73,253.88
Rye................bu.	62	124	105.40	1,122	11,220	7,854.00
Barley.............bu.	1,615	....	....	710	7,810	3,280.20
Emmer ("speltz")..bu.	327	....	....	180	2,160	1,058.40
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	655	....	....	483	29,463	25,632.80
Sweet potatoes......bu.	5	125	156.25	7	350	350.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	10	1,500	82.50	18	6,300	189.00
Millet & hungarian, tons	2,801	2,801	19,607.00	3,514	5,271	28,990.50
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	238	4,760	2.380.00	....	....	....
forage or grain..tons	12,171	....	85,197.00	6,739	....	64,020.50
Milo maize........tons	934	1,401	10,508.00	1,703	5,109	25,545.00
Kafir-corn........tons	17,293	28,822	201,754.00	16,436	57,526	230,104.00
Jerusalem corn....tons	27	45	315.00	....	....	....
Timothy..........tons	2	* 14,289	142,890.00	....	† 13,094	91,658.00
Clover............tons	....			10		
Blue-grass........tons	5			....		
Alfalfa...........tons	7,569			5,662		
Orchard-grass.....tons	2			....		
Other tame grasses, tons	77			....		
Prairie-grass fnc'd, tons	162,760	4,177	37,593.00	164,473	1,541	7,705.00
Totals.............	408.463	....	$693.725.25	408,261	....	$1,751 938.09

Corn on hand March 1, 1911, 295,221 bushels; March 1, 1912, 11,955 bushels.
Wheat on hand March 1, 1911, 48,490 bushels; March 1, 1912, 3575 bushels.

*** Product of 1910. † Product of 1911.**

SUMMARY.—GRAHAM COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops .... acres	408,463	$693,725.25	408,261	$1,751,938.09
Animals slaughtered and sold for slaughter....	....	641,915.00	....	238,814.00
Poultry and eggs sold..........	....	86,991.00	....	54,834.00
Wool clip............ lbs.	30	5.10	....	....
Cheese............ lbs.	50	6.50	....	....
Butter............ lbs.	195.895	47,014.80	184,392	46,098.00
Milk sold..........	....	27,777.00	....	25,108.00
Honey and beeswax........ lbs.	30	4.50	....	....
Wood marketed..........	....	446.00	....	....
Totals..........	....	$1.497,885.15	....	$2.166,787.09

LIVE STOCK.—GRAHAM COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses..........	9,975	$1,127,175.00	8,824	$997,112.00	331	172
Mules and asses..........	1,789	234,359.00	1,677	219,687.00	19	10
Milch cows..........	6,706	268,240.00	6,349	285,705.00	110	118
Other cattle..........	12,651	341,577.00	9,033	289,056.00	265	182
Sheep..........	627	2,633.40	260	1,105.00	7	....
Swine..........	18,518	185,180.00	4,860	48,600.00	904	....
Totals..........	50,266	$2,159,164.40	31.008	$1,841,265.00	1.636	482

Number of dogs in county March 1, 1911, 1740; March 1, 1912, 1567.
Number of sheep killed by dogs, year ending March 1, 1911, 10.
Number of sheep killed by wolves, year ending March 1, 1911, 26.

GRANT COUNTY.

Organized in 1888; area, 576 square miles; population, 981; rank in population, 103; assessed valuation, $1,937,422; county seat, New Ulysses, population, 74.

POPULATION AND VALUATION.—GRANT COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......	1.095	981	$1,545,190	$19,960	$272,272	....	$1,937.422
New Ulysses......	66 } 270	74 } 229	$436,273	$19,960	$111,081	....	$567,264
Lincoln tp........	204 }	155 }					
Sherman tp.......	399	363	617,157	....	73.295	....	690,452
Sullivan tp.......	426	389	591,760	....	87,946	....	679.706

FARM AND CROP STATISTICS.—GRANT COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	116	464	$417.60	854	8,540	$6,832.00
Spring wheat.......bu.	....	....	....	....	....	....
Corn...............bu.	1,511	....	....	919	15,623	9,373.80
Oats...............bu.	122	....	....	53	1,060	424.00
Rye................bu.	112	....	....	90	720	504.00
Barley.............bu.	579	2,895	1,592.25	188	4,324	1,945.80
Emmer ("speltz")..bu.	23	....	....	5	90	43.20
Buckwheat..........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	10	100	125.00	10	480	456.00
Sweet potatoes......bu.	1	60	75.00	....	....	....
Castor-beans........bu.	....	....	....	6	48	52.80
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	3,950	493,750	27,156.25	3,189	1,116,150	27,903.75
Millet & hungarian, tons	135	68	544.00	184	322	1,610.00
Sugar-beets.......tons	1	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	3	90	45.00	....	....	....
forage or grain..tons	5,578	....	27,890.00	4,994	....	44,946 00
Milo maize........tons	6,734	6,734	53,872.00	5,658	11,316	56,580.00
Kafir-corn........tons	3,324	3,324	26,592.00	3,128	6,256	31,280.00
Jerusalem corn....tons	283	283	2,264.00	55	110	550.00
Timothy..........tons	....	* 25	237.50	....	† 177	1,416.00
Clover...........tons	....			5		
Blue-grass........tons	....			....		
Alfalfa...........tons	169			168		
Orchard-grass.....tons	....			....		
Other tame grasses, tons	....			....		
Prairie-grass fnc'd, tons	51,799	453	3,624.00	53,815	874	5,244.00
Totals.............	74,450	....	$144,434.60	73,321	....	$189,161.35

Corn on hand March 1, 1911, 2095 bushels; March 1, 1912, 36 bushels.
Wheat on hand March 1, 1911, 420 bushels; March 1, 1912, 25 bushels.

*** Product of 1910. † Product of 1911.**

SUMMARY.—GRANT COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops..........................acres	74,450	$144,434.60	73,321	$189,161.35
Animals slaughtered and sold for slaughter....	....	35,520 00	....	48,443.00
Poultry and eggs sold.......................	....	2,561.00	....	1,259.00
Wool clip..............................lbs.	5,100	867.00	4,800	960.00
Cheese.................................lbs.	....	....	....	....
Butter.................................lbs.	21,519	5,164.56	13,802	3,450.50
Milk sold...................................	....	779.00	....	4,244.00
Honey and beeswax.....................lbs.	1	....	....	....
Wood marketed...............................	....	....	....	....
Totals......................................	....	$189,326.16	....	$247,517 85

LIVE STOCK.—GRANT COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	2,285	$258,205.00	2,215	$250,295.00	8	12
Mules and asses	458	59,998.00	553	72,448.00	....	....
Milch cows	2,314	92,560.00	2,100	94,500.00	2	4
Other cattle	6,910	186,570.00	5,022	160,704.00	54	41
Sheep	695	2,919.00	948	4,007.75	....	....
Swine	456	4,560.00	410	4,100.00	....	9
Totals	13,118	$604,812.00	11,243	$586,049.75	64	66

Number of dogs in county March 1, 1911, 256; March 1, 1912, 157.
Number of sheep killed by wolves, year ending March 1, 1912, 1.

GRAY COUNTY.

Organized in 1887; area, 864 square miles; population, 3027; rank in population, 92; assessed valuation, $7,692,437; miles of railroad, main track, 25.63; county seat, Cimarron, population, 542.

FARM AND CROP STATISTICS.—GRAY COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	16,268	81,340	$68,325.60	46,354	509,894	$367,123.68
Spring wheat.......bu.	214	856	651.60	21	210	144.90
Corn...............bu.	19,564	215,204	118,862.20	13,113	275,373	137,686.50
Oats...............bu.	7,050	70,500	28,905.00	2,582	74,878	28,453.64
Rye................bu.	728	4,368	3,712.80	282	2,820	1,974.00
Barley.............bu.	6,258	62,580	31,290.00	2,988	74,700	33,615.00
Emmer ("speltz")..bu.	1,365	6.825	3,276.00	180	4,140	1,904.40
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	61	1,403	1,403.00	26	1,508	1,337.04
Sweet potatoes......bu.	6	240	300.00	2	210	210.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	737	257,950	15,477.00	762	342,900	10,287.00
Millet & hungarian, tons	1,235	1,235	8,028.00	577	865	4,325.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	30	1,500	750.00	40	2,800	1,344.00
forage or grain..tons	11,979	....	95,832.00	8,070	....	76,665.00
Milo maize........tons	7,010	10,515	63,090.00	5,261	15,783	78,915.00
Kafir-corn........tons	7,734	15,468	85,074.00	5,959	17,877	80,446.50
Jerusalem corn....tons	....	....	....	61	183	823.50
Timothy..........tons	....	* 5,572	50,148.00	....	† 705	5,992.50
Clover............tons	....			....		
Blue-grass........tons	....			....		
Alfalfa...........tons	2,626			1,410		
Orchard-grass.....tons	....			....		
Other tame grasses, tons	....			....		
Prairie-grass fnc'd, tons	66,129	1,140	11,520.00	66,129	1,270	8,890.00
Totals	148,994	....	$586,145.20	158,817	....	$840,137.66

Corn on hand March 1, 1911, 16,445 bushels; March 1, 1912, 7100 bushels.
Wheat on hand March 1, 1911, 11,790 bushels; March 1, 1912, 1785 bushels.

* Product of 1910. † Product of 1911.

POPULATION AND VALUATION.—GRAY COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county	3,088	3,027	$5,236,672	$258,749	$826,103	$1,370,913	$7,692,437
Cimarron	556 } 955	542 } 928	....	$240,972	$248,682	$90,006	$579,660
Cimarron tp	399	386	$737,368	2,955	85,682	563,051	1,389,056
Foote tp	183	195	646,939	....	41,088	1,280	689,257
Hess tp	697	702	1,415,684	....	198,957	1,273	1,615,914
Ingalls tp	678	642	650,083	14,822	112,018	289,889	1,066,757
Logan tp	214	204	755,657	....	42,155	425,227	1,223,039
Montezuma tp	316	356	1,030,991	....	97,576	187	1,128,754

SUMMARY.—GRAY COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops ... acres	148,994	$586,145.20	153,817	$840,137.66
Animals slaughtered and sold for slaughter	....	40,603.00	....	40,060.00
Poultry and eggs sold	....	18,213.00	....	13,320.00
Wool clip ... lbs.	....	....	7,900	1,580.00
Cheese ... lbs.	....	....	....	....
Butter ... lbs.	36,496	8,759.04	31,248	7,812.00
Milk sold	....	14,006.00	....	13,150.00
Honey and beeswax ... lbs.	745	111.75	1,190	180.50
Wood marketed	....	....	....	855.00
Totals	....	$667,837.99	....	$917,095.16

LIVE STOCK.—GRAY COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	4,218	$476,634.00	4,046	$457,198.00	101	171
Mules and asses	943	123,533.00	1,206	157,986.00	7	12
Milch cows	2,802	112,080.00	3,197	143,865.00	39	127
Other cattle	3,975	107,325.00	4,012	128,384.00	66	453
Sheep	1,022	4,292.40	830	3,527.50	2	20
Swine	869	8,690.00	935	9,350.00	34	122
Totals	13,829	$832,554.40	14,226	$900,310.50	249	905

Number of dogs in county March 1, 1911, 507; March 1, 1912, 408.
Number of sheep killed by dogs, year ending March 1, 1912, 2.

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GREELEY COUNTY.

Organized in 1888; area, 780 square miles; population, 1088; rank in population, 102; assessed valuation, $3,599,047; miles of railroad, main track, 26.21; county seat, Tribune, population, 206.

POPULATION AND VALUATION.—GREELEY COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots	Personal.	Railroad, etc.	Total.
The county	**1,278**	**1,088**	**$2,156,816**	**$65,640**	**$317,960**	**$1,058,631**	**$3,599,047**
Colony tp	**425**	**383**	**$914,375**	....	**$103,170**	**$464,568**	**$1,482,113**
Harrison tp	**168**	**131**	**581,368**	....	**52,880**	**332,709**	**966,967**
Horace	**147**	**151**	....	**$16,960**	**17,850**	**65,868**	**100,678**
Tribune	**163 } 685**	**206 } 574**	....	**48,680**	**68,850**	**36,927**	**154,457**
Tribune tp	**375**	**217**	**661,073**	....	**75,210**	**158,559**	**894,842**

FARM AND CROP STATISTICS.—GREELEY COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	....	....	....	179	716	$572.80
Spring wheat.......bu.	141	....	....	112	458	333.76
Corn...............bu.	2,132	....	....	1,481	28,139	16,833.40
Oats...............bu.	167	....	....	218	2,616	1,098.72
Rye................bu.	26	....	....	10	90	63.90
Barley.............bu.	483	....	....	602	8,428	4,214.00
Emmer ("speltz")..bu.	16	....	....	7	77	37.73
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	14	392	$490.00	....	....	....
Sweet potatoes......bu.	....	....	....	....	....	....
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	1,220	183,000	9,150.00	973	389,200	15,568.00
Millet & hungarian, tons	606	303	2,424.00	513	1,026	5,643.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	20	400	200.00	10	500	250.00
forage or grain..tons	5,562	....	33,372.00	5,364	....	42,912.00
Milo maize........tons	1,652	1,652	13,216.00	1,814	3,628	18,140.00
Kafir-corn........tons	1,232	616	4,928 00	1,172	2,930	13,185.00
Jerusalem corn....tons	75	38	304.00	21	52	234.00
Timothy..........tons	....			....		
Clover............tons	10			....		
Blue-grass........tons	....			....		
Alfalfa...........tons	218	* 60	780.00	90	†	....
Orchard-grass.....tons	....			....		
Other tame grasses, tons	....			....		
Prairie-grass fnc'd, tons	78,157	65	650.00	51,828	*	
Totals............	91,731	....	$65,514.00	64,394	....	$119,136.31

Corn on hand March 1, 1911, 3743 bushels.
Wheat on hand March 1, 1911, 206 bushels.

*** Product of 1910. † Product of 1911.**

SUMMARY.—GREELEY COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops .... acres	91,731	$65,514.00	64,394	$119,136.31
Animals slaughtered and sold for slaughter....	....	31,740.00	....	15,982.00
Poultry and eggs sold..........	....	6,821.00	....	2,987.00
Wool clip .... lbs.	....	....	....	....
Cheese.............. lbs.	....	....	....	....
Butter.............. lbs.	20,412	4,898.88	12,677	3,169.25
Milk sold..............	....	15,127.00	....	11,816.00
Honey and beeswax.......... lbs.	....	....	....	....
Wood marketed..............	....	....	....	....
Totals..............	....	$124,100.88	....	$153,090.56

LIVE STOCK.—GREELEY COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	2,544	$287,472.00	2,414	$272,782.00	33	42
Mules and asses	332	43,492.00	252	33,012.00	1	7
Milch cows..............	1,858	74,320 00	2,184	98,280.00	10	68
Other cattle..............	5,207	140,589.00	5,061	161,962 00	130	234
Sheep	910	3,822.00	45	191.25	....	5
Swine..............	385	3,850.00	225	2,250.00	....	1
Totals..............	11,236	$553,545 00	10,181	$568,467.25	174	357

Number of dogs in county March 1, 1911, 235; March 1, 1912, 217.

GREENWOOD COUNTY.

Organized in 1862; area, 1155 square miles; population, 15,468; rank in population, 44; assessed valuation, $33,090,455; miles of railroad, main track, 149.83; county seat, Eureka, population, 2462.

POPULATION AND VALUATION.—GREENWOOD COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......	15,589	15,468	$18,408,378	$2,225,485	$6,696,640	$5,759,952	$33,090,455
Bachelor tp.......	682	714	$1,130,445	$3,950	$350,510	$589,680	$2,074,585
Eureka..........	2,457 } 3,104	2,462 } 3,067	....	1,245,940	910,170	108,250	2,264,360
Eureka tp........	647	605	1,193,758	....	380,890	365,990	1,940,638
Fall River tp......	882	1,017	1,043,115	19,690	337,725	238,230	1,638,760
Hamilton.........	370 } 1,524	400 } 1,513	....	118,970	197,635	23,660	340,265
Janesville tp......	1,154	1,113	2,337,616	....	690,465	435,510	3,463,591

POPULATION AND VALUATION.—GREENWOOD COUNTY.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal	Railroad, etc.	Total.
Lane tp..........		578		569	853,218	18,835	210,725	422,540	1,505,318
Madison..........	690	1,811	643	1,767	....	279,690	266,960	86,290	632,940
Madison tp........	1,121		1,124		2,145,601	....	520,530	586,760	3,252,891
Otter Creek tp....		1,030		997	1,651,398	38,158	407,070	500,440	2,597,058
Pleasant Grove tp.		532		523	852,181	....	189,200	259,790	1,301,171
Quincy tp.........		803		802	1,100,267	49,665	305,760	446,100	1,901,792
Salem tp..........		244		225	1,051,186	....	109,075	....	1,160,261
Fall River........	316	1,096	334	1,117	....	137,145	181,195	29,710	348,050
Salt Springs tp....	780		783		1,041,702	....	217,460	288,680	1,547,842
Shell Rock tp......		682		680	869,475	20,160	300,980	296,700	1,487,265
South Salem tp....		577		529	1,855,780	....	422,090	....	1,777,870
Spring Creek tp...		555		582	838,070	21,650	250,005	349,840	1,459,565
Severy...........	549	1,489	621	1,416	....	271,635	245,995	61,582	579,212
Twin Groves tp....	940		795		944,571	....	202,250	670,200	1,817,021

FARM AND CROP STATISTICS.—GREENWOOD COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	1,891	32,147	$27,824.96	2,751	49,518	$41,595.12
Spring wheat.......bu.	8	112	84.00	....	....	....
Corn...............bu.	99,705	1,596,280	957,168.00	85,437	1,281,555	768,933.00
Oats...............bu.	13,071	274,491	107,051.49	2,651	74,228	28,948.92
Rye................bu.	66	990	792.00	129	2,322	1,695.06
Barley.............bu.	2	50	25 00	....	....	....
Emmer ("speltz")..bu.	20	400	180.00	....	....	....
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	997	32,901	32,901.00	725	56,550	45,240.00
Sweet potatoes......bu.	3	105	181.25	5	400	400.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	1,409	4,932	8,877.60	115	805	1,207.50
Tobacco...........lbs.	....	....	....	....	....	....
Broom-corn........lbs.	....	....	....	10	5,000	200.00
Millet & hungarian, tons	516	1,032	6,192.00	457	914	5,027.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	160	12,000	5,760.00	170	11,900	5,712.00
forage or grain..tons	12,728	....	101,824.00	16,904	....	169,040.00
Milo maize........tons	9	27	162.00	177	531	2,655.00
Kafir-corn........tons	20,850	61,050	305,250.00	42,283	126,699	633,495.00
Jerusalem corn....tons	....	....	....	2	6	30.00
Timothy...........tons	1,580	* 29,599	266,391.00	218	† 29,187	247,664.50
Clover............tons	4,190			840		
Blue-grass........tons	890			559		
Alfalfa...........tons	16,210			18,726		
Orchard-grass.....tons	70			23		
Other tame grasses, tons	255			75		
Prairie-grass fnc'd, tons	326,117	25,870	181,090.00	315,742	26,154	183,078.00
Totals.............	500,247	....	$2,001,204.29	487,949	....	$2,134,921.10

Corn on hand March 1, 1911, 313,090 bushels; March 1, 1912, 220,548 bushels.
Wheat on hand March 1, 1911, 150 bushels; March 1, 1912, 265 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—GREENWOOD COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops ..... acres	500,247	$2,001,204.29	487,949	$2,184,921.10
Animals slaughtered and sold for slaughter	....	3,449,114.00	....	3,281,540.00
Poultry and eggs sold	....	157,002.00	....	154,476.00
Wool clip ..... lbs.	17,000	2,890.00	8,110	1,622.00
Cheese ..... lbs.	75	9.75	25	3.50
Butter ..... lbs.	266,903	64,056.72	255,579	63,894.75
Milk sold	....	59,558.00	....	56,000.00
Honey and beeswax ..... lbs.	6,271	956.85	2,537	381.05
Wood marketed	....	737.00	....	741.00
Totals	....	$5,735,528.61	....	$5,693,579.40

LIVE STOCK.—GREENWOOD COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	13,182	$1,483,916.00	12,978	$1,466,514.00	305	207
Mules and asses	3,858	439,898.00	3,574	468,194.00	24	25
Milch cows	10,304	412,160.00	11,885	534,825.00	166	84
Other cattle	46,856	1,251,612.00	46,981	1,508,392.00	339	305
Sheep	4,081	17,140.20	1,932	8,211.00	106	11
Swine	34,595	345,950.00	31,831	318,310.00	759	2,216
Totals	111,826	$3,950,676.20	109,181	$4,299,446.00	1,699	2,848

Number of dogs in county March 1, 1911, 2826; March 1, 1912, 2267.
Number of sheep killed by dogs, year ending March 1, 1911, 100.
Number of sheep killed by wolves year ending March 1, 1911, 55.

HAMILTON COUNTY.

Organized in 1886; area, 972 square miles; population, 2797; rank in population, 94; assessed valuation, $5,229,190; miles of railroad, main track, 28.59; county seat, Syracuse, population, 873.

POPULATION AND VALUATION.—HAMILTON COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county		3,081		2,797	$2,428,895	$378,570	$697,797	$1,723,928	$5,229,190
Bear Creek tp		433		338	$393,785	....	$80,204	$292	$474,281
Coolidge	118	344	96	323	....	$38,265	23,112	68,363	129,740
Coolidge tp	226		227		274,940	1,335	68,203	288,211	632,689
Kendall tp		242		256	285,655	6,640	96,081	339,606	727,982
Lamont tp		410		353	304,735	....	23,000	....	327,735
Liberty tp		204		156	220,330	....	18,216	....	238,546
Medway tp		123		143	306,190	1,215	51,054	336,085	694,544
Richland tp		203		168	346,275	....	21,695	....	367,970
Syracuse	887	1,122	873	1,060	....	323,005	253,281	231,127	807,413
Syracuse tp	235		187		296,985	8,110	62,951	460,244	828,290

FARM AND CROP STATISTICS.—HAMILTON COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	....	....	....	1,095	7,665	$5,748.75
Spring wheat.......bu.	69	....	....	5	35	24.85
Corn.....................bu.	1,648	4,944	$3,213.60	924	18,480	11,088.00
Oats.....................bu.	421	....	....	420	9,240	3,880.80
Rye......................bu.	173	....	....	22	264	187.44
Barley..................bu.	225	1,125	618.75	478	9,560	4,302.00
Emmer ("speltz")..bu.	71	213	106.50	17	255	122.40
Buckwheat...........bu.	1	....	....	....	....	....
Irish potatoes.......bu.	30	450	562.50	15	750	675.00
Sweet potatoes......bu.	....	....	....	....	....	....
Castor-beans........bu.	....	....	....	....	....	....
Cotton.................lbs.	....	....	....	....	....	....
Flax.....................bu.	2	....	....	....	....	....
Tobacco...............lbs.	....	....	....	....	....	....
Broom-corn..........lbs.	5,641	564,100	25,384.50	5,509	2,203,600	66,108.00
Millet & hungarian, tons	287	144	1,152.00	225	393	1,965.00
Sugar-beets.........tons	15	75	375.00	25	250	1,250.00
Sorghum for—						
syrup or sugar...gals.	....	....	....	....	....	....
forage or grain..tons	5,432	....	43,456.00	4,371	....	39,339.00
Milo maize..........tons	9,011	9,011	72,088.00	5,842	11,684	58,420.00
Kafir-corn...........tons	2,748	2,748	21,984 00	1,571	3,927	17,671.50
Jerusalem corn....tons	366	366	2,928.00	132	330	1,485.00
Timothy..............tons	....			....		
Clover.................tons	2			....		
Blue-grass...........tons	....	* 3,123	34,353.00	....	† 3,238	29,142.00
Alfalfa.................tons	3,727			3,419		
Orchard-grass.....tons	....			1		
Other tame grasses, tons	....			....		
Prairie-grass fnc'd, tons	63,565	2,430	24,300.00	47,396	1,202	9,015.00
Totals..............	93,434	....	$230,521.85	71,467	....	$250,424.74

Corn on hand March 1, 1911, 678 bushels; March 1, 1912, 41 bushels.
Wheat on hand March 1, 1911, 720 bushels.

***Product of 1910. †Product of 1911.**

SUMMARY.—HAMILTON COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops..............................acres	93,434	$230,521.85	71,467	$250,424.74
Animals slaughtered and sold for slaughter....	....	44,487.00	....	82,311.00
Poultry and eggs sold..........................	....	11,245.00	....	7,882.00
Wool clip..................................lbs.	19,780	3,362.60	22,015	4,408.00
Cheese.....................................lbs.	....	....	....	....
Butter......................................lbs.	39,925	9,582 00	35,745	8,936.25
Milk sold..	....	21,658.00	....	18,943.00
Honey and beeswax.......................lbs.	1,914	287.30	845	126.75
Wood marketed...................................	....	....	....	....
Totals..	....	$321,143.75	....	$373,031.74

LIVE STOCK.—Hamilton County.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	3,193	$360,809.00	2,996	$338,548.00	56	72
Mules and asses	453	59,343.00	553	72,443.00	9	15
Milch cows	3,926	157,040.00	4,487	201,915.00	9	169
Other cattle	9,245	249,615.00	7,988	255,616.00	77	398
Sheep	4.879	20,491.80	5,458	23,196.50	1,020	9
Swine	838	8,380.00	485	4,850.00	25	50
Totals	22.534	$855,678.80	21,967	$896,568.50	1.196	713

Number of dogs in county March 1, 1911, 497; March 1, 1912, 465.
Number of sheep killed by wolves, year ending March 1, 1911, 6; March 1, 1912, 3.

HARPER COUNTY.

Organized in 1873; area, 810 square miles; population, 13,737; rank in population, 47; assessed valuation, $28,941,312; miles of railroad, main track, 166.86; county seat, Anthony, population, 2602.

POPULATION AND VALUATION.—Harper County.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county		13,427		13.737	$16,560,446	$2,776,695	$4,677,986	$4,926,185	$28,941,312
Anthony	2,552	3,337	2,602	3,351	....	$1,674,820	$1,009,815	$188,461	$2,873,096
Anthony tp	785		749		$1,264,566	18,805	253,210	834,030	2,370,611
Harper	1,337	1,769	1,551	1,985	....	638,315	335,315	125,498	1,099,128
Banner tp	432		434		805,506	....	118,625	524,598	1,448,729
Berlin tp		357		337	832,243	....	110,505	130,869	1,073,617
Blaine tp		492		498	786,467	17,530	173,375	153,864	1,131,236
Chicaskia tp		269		312	638,887	998	134,439	52,999	827.323
Waldron	232	682	223	668	....	44,421	73,030	48,577	166,028
Eagle tp	450		445		859,750	....	141,970	467,279	1,468.999
Empire tp		256		254	771,999	....	137,925	....	909,924
Garden tp		290		285	627,258	....	85,894	....	713,152
Grant tp		485		465	717,990	9,135	119,280	227,446	1,073,851
Green tp		296		362	386,127	3,568	68,955	285,136	743,786
Harper tp		416		445	777,474	1,515	128,931	135,892	1,043,812
Lake tp		227		229	420,920	1,780	74,833	114,416	611,949
Lawn tp		403		401	709,094	....	162,919	298,760	1,170,773
Liberty tp		309		294	603,877	....	101,190	325	705,392
Odell tp		503		527	1,003,115	25,870	214,330	348,419	1,591,734
Pilot Knob tp		418		432	928,661	....	155,110	260,208	1,343,979
Attica	571	802	579	796	....	191,620	192,085	72,977	456,683
Ruella tp	231		217		414,646	3,955	73,690	141,820	634,111
Freeport	183	561	163	530	....	48,500	49,690	21,001	119.191
Silver Creek tp	378		367		970,292	....	139,663	113,398	1,223,353
Spring tp		565		565	1,286,227	4,553	276,235	260,475	1.827,490
Bluff	244	990	245	1,001	....	91,309	127,455	13,903	232,667
Stohrville tp	746		756		1,755,347	....	219,517	105,834	2,080,698

FARM AND CROP STATISTICS.—HARPER COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	34,066	340,660	$296,374.20	116,355	1,628,970	$1,319,465.70
Spring wheat.......bu.	30	240	182.40	....	....	....
Corn...............bu.	156,349	1,876,188	1,013,141.52	81,416	1,058,408	539,788.08
Oats...............bu.	76,135	1,674,970	602,989.20	36,673	880,152	334,457.76
Rye................bu.	67	536	455.60	112	1,568	1,113.28
Barley.............bu.	156	1,560	858.00	196	3,724	1,675.80
Emmer ("speltz")..bu.	....	....	....	....	....	....
Buckwheat..........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	364	5,460	6,279.00	348	31,320	25,056.00
Sweet potatoes......bu.	14	1,050	1,312.50	18	1,800	1,710.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	6	2,400	156.00	22	11,000	385.00
Millet & hungarian, tons	705	1,410	8,460.00	757	1,514	7,570.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	60	3,300	1,650.00	152	10,640	5,320.00
forage or grain..tons	1,480	....	11,840.00	1,578	....	14,102.00
Milo maize........tons	84	252	1,764.00	231	577	2,885.00
Kafir-corn........tons	12,137	42,480	254,880 00	29,159	87,477	349,908.00
Jerusalem corn....tons	....	....	....	58	174	696.00
Timothy..........tons	13	* 18,813	188,120.00	....	† 17.547	175,470.00
Clover............tons	....			....		
Blue-grass........tons	10			....		
Alfalfa...........tons	13,805			15,545		
Orchard-grass.....tons	1			7		
Other tame grasses, tons	....			....		
Prairie-grass fnc'd, tons	117,571	6,348	50,784.00	115,605	6,673	53,384.00
Totals	413,053	....	$2,439,246.42	398,232	....	$2,832,986.62

Corn on hand March 1, 1911, 136,962 bushels; March 1, 1912, 228,227 bushels.
Wheat on hand March 1, 1911, 204,031 bushels; March 1, 1912, 28,945 bushels.
***Product of 1910. † Product of 1911.**

SUMMARY.—HARPER COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops.............................acres	413 053	$2,439,246.42	398,232	$2,832,986.62
Animals slaughtered and sold for slaughter...	....	709,236.00	....	392,522.00
Poultry and eggs sold.........................	....	98,754.00	....	96,048.00
Wool clip................................lbs.	1.040	176.80	3,368	673 60
Cheese...................................lbs	172	22.36	352	49.28
Butter...................................lbs	388.613	104.127.12	618,494	170,623.50
Milk sold.....................................	....	37.721.00	....	43,993.00
Honey and beeswax........................lbs.	852	127.80	665	99.75
Wood marketed.................................	....	75.00	....	28.00
Totals......................................	....	$3,889,486.50	....	$3,536,023.75

LIVE STOCK.—HARPER COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	12,402	$1,401,426.00	12,210	$1,379,780.00	284	620
Mules and asses	3,294	431,514.00	3,381	442,911.00	29	42
Milch cows	7,454	298,160.00	8,492	382,140.00	87	237
Other cattle	13,996	377,892.00	14,690	470,080 00	250	787
Sheep	935	3,927 00	538	2,286.50	....	59
Swine	25,783	257,830 00	12,262	122,620.00	2,818	21,869
Totals	63,864	$2,770,749 00	51,573	$2,799,767.50	3,463	23,114

Number of dogs in county March 1, 1911, 2234; March 1, 1912, 2101.
Number of sheep killed by dogs, year ending March 1, 1912, 2.
Number of sheep killed by wolves, year ending March 1, 1911, 1.

HARVEY COUNTY.

Organized in 1872; area, 540 square miles; population, 19,196; rank in population, 30; assessed valuation, $35,388,330; miles of railroad, main track, 85.27; county seat, Newton, population, 8114.

FARM AND CROP STATISTICS.—HARVEY COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	69,090	1,381,800	$1,243,620.00	82,219	1,479,942	$1,243,151.28
Spring wheat.......bu.	31	527	411.06	10	160	126.40
Corn...............bu.	77,060	1,387,080	790,635.60	69,743	1,743,575	871,787.50
Oats...............bu.	34,934	733,614	271,437.18	28,214	874,634	323,614.58
Rye................bu.	813	9,756	7,804.80	992	14,880	10,416.00
Barley.............bu.	1,031	16,496	9,072.80	350	8,750	3,762.50
Emmer ("speltz")..bu.	21	315	141.75	....	....	....
Buckwheat.........bu.	15	135	135.00	....	....	....
Irish potatoes.......bu.	512	12,800	13,824.00	522	33,408	27,060.48
Sweet potatoes......bu.	48	3,024	3,780.00	59	7,375	6,637.50
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	51	153	275.40	10	70	105.00
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	5	2,000	140.00	....	....	....
Millet & hungarian, tons	678	1,356	8,814.00	373	746	3,730.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	117	7,605	3,802.50	52	3,900	1,872.00
forage or grain..tons	1,705	....	11,935.00	2,502	....	27,522.00
Milo maize........tons	8	24	144.00	444	1,110	5,550.00
Kafir-corn.........tons	2,437	7,311	43,866.00	3,708	11,124	55,620.00
Jerusalem corn....tons	15	45	270.00	6	18	90.00
Timothy..........tons	1	* 21,639	213,690.00	....	† 19,072	181,184.00
Clover............tons	....			....		
Blue-grass........tons	128			56		
Alfalfa...........tons	15,580			16,087		
Orchard-grass.....tons	10			36		
Other tame grasses, tons	40			12		
Prairie-grass fnc'd, tons	79,508	14,712	117,696.00	75,451	12,589	100,712.00
Totals	283,838	....	$2,741,495.09	280,846	....	$2,862,941.24

Corn on hand March 1, 1911, 378,466 bushels; March 1, 1912, 214,063 bushels.
Wheat on hand March 1, 1911, 34,078 bushels; March 1, 1912, 37,749 bushels.

* Product of 1910. † Product of 1911.

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POPULATION AND VALUATION.—HARVEY COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county	19,189	19,196	$16,773,279	$5,878,823	$7,311,988	$5,424,240	$35,388,330
Alta tp	562	594	$1,026,372	....	$160,506	$491	$1,187,369
Burrton	744 } 1,206	615 } 1,087	....	$199,019	228,731	95,862	523,612
Burrton tp	462	472	862,678	....	93,526	483,238	1,439,442
Darlington tp	476	475	1,173,394	824	227,414	37,811	1,439,443
Hesston	184 } 822	236 } 859	1,233,588	68,005	357,330	247,258	1,906,181
Emma tp	638	623					
Garden tp	535	510	1,210,486	....	167,151	100	1,377,737
Halstead	972 } 1,558	1,029 } 1,632	....	565,015	1,222,304	96,600	1,883,919
Halstead tp	586	603	1,182,812	....	223,150	347,906	1,753,368
Highland tp	521	582	1,139,314	....	236,171	163,749	1,539,234
Lake tp	570	517	771,494	4,099	165,580	292,000	1,233,173
Lakin tp	610	490	1,100,728	....	222,002	25,411	1,348,141
Macon tp	529	500	1,239,645	....	266,689	578,079	2,084,413
Newton	8,057 } 8,859	8,114 } 8,887	....	4,601,688	2,249,662	785,479	7,636,829
Newton tp	800	773	1,353,348	26,313	355,420	779,803	2,514,884
Pleasant tp	608	613	1,117,085	2,450	195,459	3,920	1,318,864
Richland tp	477	496	1,058,892	4,343	127,116	397,595	1,587,946
Sedgwick	648 } 1,187	705 } 1,273	....	339,541	332,396	98,399	770,336
Sedgwick tp	539	568	1,253,481	....	247,144	462,141	1,962,766
Walton	217 } 671	210 } 681	....	67,526	91,257	19,616	178,399
Walton tp	454	471	1,050,512	....	142,980	508,782	1,702,274

SUMMARY.—HARVEY COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops ... acres	283,838	$2,741,495.09	280,846	$2,862,941.24
Animals slaughtered and sold for slaughter	....	777,107.00	....	575,939.00
Poultry and eggs sold	....	138,433.00	....	118,754 00
Wool clip ... lbs.	10,248	1,741.31	7,635	1,527.60
Cheese ... lbs.	600	78.00	872	122.08
Butter ... lbs.	598,618	162,484 98	617,489	167,734.57
Milk sold	....	87,887.00	....	80,569 00
Honey and beeswax ... lbs.	14,906	2,266.80	4,958	746.90
Wood marketed	....	604.00	....	64.00
Totals	....	$3,907,097.18	....	$3,808,397.79

LIVE STOCK.—HARVEY COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	10,567	$1,194,071.00	11,182	$1,257,916.00	206	389
Mules and asses	2,083	272,873.00	2,254	295,274.00	10	26
Milch cows	7,324	292,960 00	7,992	359,640.00	100	127
Other cattle	14,655	395,685.00	14,104	451,328.00	417	521
Sheep	3,330	13,986.00	5,464	23,222.00	48	835
Swine	25,718	257,180.00	20,771	207,710.00	1,478	6,352
Totals	63,677	$2,426,755.00	61,717	$2,595,090.00	2,259	8,260

Number of dogs in county March 1, 1911, 2016; March 1, 1912, 1831.
Number of sheep killed by dogs, year ending March 1, 1911, 99; March 1, 1912, 5.
Number of sheep killed by wolves, year ending March 1, 1911, 2; March 1, 1912, 3.

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HASKELL COUNTY.

Organized in 1887; area, 576 square miles; population, 901; rank in population, 104; assessed valuation, $2,961,865; county seat, Santa Fe.

POPULATION AND VALUATION.—HASKELL COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county	**1,015**	**901**	**$2,672,161**	**$30,955**	**$257,944**	**$805**	**$2,961,865**
Dudley tp	**304**	**248**	**$810,226**	....	**$44,305**	....	**$854,531**
Haskell tp	**414**	**375**	**920,845**	**$30,955**	**132,260**	....	**1,084,060**
Lockport tp	**297**	**278**	**941,090**	....	**81,379**	**$805**	**1,023,274**

FARM AND CROP STATISTICS.—HASKELL COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	2,754	5,508	$4,957.20	5,503	55,030	$42,373.10
Spring wheat.......bu.	90	....	....	35	280	201.60
Corn...............bu.	1,360	....	....	5,335	112,035	59,378.55
Oats...............bu.	1,585	4,755	2,139.75	839	18,458	7,567.78
Rye................bu.	48	....	....	18	180	126.00
Barley.............bu.	1,929	11,574	5,902.74	1,022	18,396	7,358.40
Emmer ("speltz")..bu.	96	480	240.00	8	136	68.00
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	11	143	178.75	1	40	36.00
Sweet potatoes......bu.	....	....	....	....	....	....
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco...........lbs.	....	....	....	....	....	....
Broom-corn........lbs.	357	107,100	6,426.00	380	171,000	3,990.00
Millet & hungarian, tons	316	316	2,528.00	187	327	1,635.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	495	14,850	7,425.00	....	....	....
forage or grain..tons	4,317	....	30,219.00	3,277	....	32,770.00
Milo maize........tons	3,108	4,662	32,634.00	3,084	7,710	42,405.00
Kafir-corn........tons	2,893	3,616	25,312.00	2,166	6,498	32,490.00
Jerusalem corn....tons	35	44	308.00	....	....	....
Timothy..........tons	....			....		
Clover............tons	....			....		
Blue-grass........tons	....			....		
Alfalfa...........tons	....	*	....	5	†	....
Orchard-grass.....tons	....			....		
Other tame grasses, tons	....			....		
Prairie-grass fnc'd, tons	50,436	176	1,408.00	22,539	932	6,058.00
Totals............	69,830	....	$119,678.44	44,399	....	$236,457.43

Corn on hand March 1, 1911, 569 bushels; March 1, 1912, 50 bushels.
Wheat on hand March 1, 1911, 2075 bushels; March 1, 1912, 120 bushels.

*** Product of 1910. † Product of 1911.**

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SUMMARY.—HASKELL COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops ....acres	69,830	$119,678.44	44,399	$236,457.43
Animals slaughtered and sold for slaughter....	....	17,960.00	....	16,861.00
Poultry and eggs sold........................	....	5,306.00	....	3,010.00
Wool clip.................................lbs.	5,411	919.87	5,600	1,120.00
Cheese....................................lbs.	....	....	....	....
Butter....................................lbs.	16,205	3,889.20	8,380	2,096.00
Milk sold....................................	....	7,274.00	....	8,586.00
Honey and beeswax.......................lbs.	....	....	....	....
Wood marketed..............................	....	528.00	....	....
Totals..................................	....	$155,555.51	....	$268,129.43

LIVE STOCK.—HASKELL COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses......................	2,063	$233,119.00	2,100	$237,300.00	19	....
Mules and asses.............	288	37,073.00	365	47,815.00	1	....
Milch cows.................	1,242	49,680 00	1,650	74,250.00	2	....
Other cattle................	2,808	75,816.00	2,816	90,112.00	6	....
Sheep......................	2,806	11,785.20	1,116	4,743.00	....	....
Swine......................	339	3,390.00	273	2,730.00	2	....
Totals.................	9,541	$410,863.20	8,320	$456,950.00	30	....

Number of dogs in county March 1, 1911, 219; March 1, 1912, 143.

HODGEMAN COUNTY.

Organized in 1879; area, 864 square miles; population, 2933; rank in population, 93; assessed valuation, $6,449,745; miles of railroad, main track, 19.89; county seat, Jetmore, population, 380.

POPULATION AND VALUATION.—HODGEMAN COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......	3,036	2,933	$4,604,515	$178,259	$1,021,225	$645,746	$6,449,745
Benton tp.........	79	72	$179,055	....	$26,995	....	$206,056
Jetmore..........	348 } 779	380 } 738	....	$144,879	153,010	$22,718	320,607
Center tp.........	395 }	358 }	703,590	....	98,100	181,561	983,251
Hallet tp.........	155	153	300,510	....	49,970	....	350,480
Hanston..........	115 } 731	118 } 758					
Marena tp........	616 }	640 }	962,500	33,380	239,020	439,048	1,673,948
North Roscoe tp...	157	134	391,370	....	80,225	1,454	473,049
Sawlog tp.........	252	200	397,970	....	69,535	....	467,505
South Roscoe tp...	164	148	353,645	....	52,335	160	406,140
Sterling tp........	527	539	966,670	....	179,425	805	1,146,900
Valley tp.........	192	191	349,205	....	72,610	....	421,815

FARM AND CROP STATISTICS.—HODGEMAN COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	14,911	44,733	$40,259.70	44,235	530,820	$398,115.00
Spring wheat.......bu.	65	....	....	....	....	....
Corn..............bu.	25,077	150,462	94,791.06	15,425	308,500	154,250.00
Oats..............bu.	12,335	49,340	21,216.20	6,298	207,834	78,976.92
Rye...............bu.	1,921	....	....	1,099	15,386	10,770.20
Barley............bu.	8,723	43,615	24,424.40	6,106	146,544	60,083.04
Emmer ("speltz")..bu.	1,868	7,472	3,736.00	435	8,265	3,967.20
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	194	3,880	4,850.00	120	7,320	6,588.00
Sweet potatoes......bu.	1	40	50.00	4	352	352.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton............lbs.	....	....	....	....	....	....
Flax..............bu.	185	....	....	....	....	....
Tobacco...........lbs.	....	....	....	1	400	40.00
Broom-corn........lbs.	95	9,500	570.00	45	20,250	607.50
Millet & hungarian, tons	2,050	2,050	14,350.00	1,549	3,098	15,490.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	195	3,900	1,950.00	365	25,550	12,775.00
forage or grain..tons	21,700	....	108,500.00	13,909	....	139,090.00
Milo maize........tons	4,247	5,309	42,472.00	1,653	3,306	18,183.00
Kafir-corn........tons	10,169	15,254	122,032.00	10,944	32,832	164,160.00
Jerusalem corn....tons	445	668	5,344.00	10	30	150.00
Timothy..........tons	....			....		
Clover...........tons	....			....		
Blue-grass........tons	....			....		
Alfalfa...........tons	1,953	* 1,165	11,650.00	1,800	† 4,312	34,496.00
Orchard-grass.....tons	....			....		
Other tame grasses, tons	....			....		
Prairie-grass fnc'd, tons	248,450	747	4,482.00	252,026	2,371	14,226.00
Totals............	354,584	....	$500,677.36	356,024	....	$1,112,319.86

Corn on hand March 1, 1911, 28,190 bushels; March 1, 1912, 1,080 bushels.
Wheat on hand March 1, 1911, 66,300 bushels; March 1, 1912, 4,970 bushels.

*** Product of 1910. †Product of 1911.**

SUMMARY.—HODGEMAN COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops..........................acres	354,584	$500,677.36	356,024	$1,112,319.86
Animals slaughtered and sold for slaughter....	....	174,233.00	....	156,285.00
Poultry and eggs sold..........................	....	27,945.00	....	20,283.00
Wool clip..............................lbs.	7,575	1,287.75	7,000	1,400.00
Cheese.................................lbs.	....	....	....	....
Butter.................................lbs.	47,100	11,304.00	43,107	10,776.75
Milk sold..................................	....	50,796.00	....	47,453.00
Honey and beeswax......................lbs.	....	....	10	1.50
Wood marketed..............................	....	....	....	....
Totals....................................	....	$766,243.11	....	$1,348,519.11

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LIVE STOCK.—HODGEMAN COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	5,962	$673,706.00	6,026	$680,938.00	48	20
Mules and asses	843	110,433.00	992	129,952.00	9	6
Milch cows	6,157	246,280.00	6,456	290,520.00	21	35
Other cattle	14,122	381,294.00	10,572	338,304.00	244	178
Sheep	1,257	5,279.40	916	3,893.00	....	....
Swine	1,663	16,630.00	1,249	12,490.00	38	21
Totals	30,004	$1,433,622.40	26,211	$1,456,097.00	360	260

Number of dogs in county March 1, 1911, 666; March 1, 1912, 599.
Number of sheep killed by dogs, year ending March 1, 1911, 7.
Number of sheep killed by wolves, year ending March 1, 1911, 3.

JACKSON COUNTY.

Organized in 1857; area, 658 square miles; population, 16,088; rank in population, 38; assessed valuation, $28,610,124; miles of railroad, main track, 107.26; county seat, Holton, population, 3,047.

FARM AND CROP STATISTICS.—JACKSON COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	20,339	325,424	$283,118.88	32,033	608,627	$486,901.60
Spring wheat.......bu.	48	681	550.62	....	....	....
Corn...............bu.	102,414	1,638,624	934,015.68	116,534	3,962,156	2,179,185 80
Oats...............bu.	25,120	376,800	143,184.00	15,343	460,290	161,101.50
Rye................bu.	130	1,950	1,657.50	166	3,320	2,423.60
Barley.............bu.	31	558	306.90	2	50	22.50
Emmer ("speltz")..bu.	48	864	388.80	....	....	....
Buckwheat.........bu.	1	10	10.00	....	....	....
Irish potatoes.......bu.	1,037	30,073	30,073.00	857	75,416	49,020.40
Sweet potatoes......bu.	....	....	....	3	276	220.80
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	8	40	70.00	....	....	....
Tobacco...........lbs.	2	2,000	200.00	....	....	....
Broom-corn........lbs.	....	....	....	....	....	....
Millet & hungarian, tons	4,596	9,192	59,748.00	5,312	10,624	53,120.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	39	3,549	1,774.50	33	2,409	1,204.50
forage or grain..tons	599	....	7,188 00	1,203	....	18,045.00
Milo maize........tons	33	116	696.00	57	199	1,094.50
Kafir-corn........tons	789	3,156	15,780.00	3,738	14,952	74,760.00
Jerusalem corn....tons	38	152	760.00	....	....	....
Timothy..........tons	18,847	* 20,952	251,424.00	15,402	† 11,240	101,160.00
Clover............tons	6,060			4,930		
Blue-grass........tons	5,557			9,791		
Alfalfa...........tons	3,892			5,733		
Orchard-grass.....tons	542			343		
Other tame grasses, tons	1,075			1,343		
Prairie-grass fnc'd, tons	98,762	16,578	165,780.00	122,171	7,137	53,527.50
Totals	290,007	....	$1,896,725.88	334,994	....	$3,181,787.70

Corn on hand March 1, 1911, 950,875 bushels; March 1, 1912, 493,209 bushels.
Wheat on hand March 1, 1911, 2765 bushels; March 1, 1912, 7845 bushels.

*** Product of 1910.** **† Product of 1911.**

POPULATION AND VALUATION.—JACKSON COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county		16,223		16,088	$16,631,653	$2,854,931	$5,701,003	$3,422,537	$28,610,124
Adrian tp.		455		445	$694,780	....	$134,205	$537	$829,522
Denison	235	1,516	238	1,432	....	$95,020	103,840	11,383	210,243
Mayetta	380		320		....	103,335	115,665	17,579	236,579
Cedar tp.	901		874		1,175,188	....	183,180	244,560	1,602,928
Douglas tp.		1,413		1,321	1,772,665	103,260	447,620	272,070	2,595,615
Holton	3,339	4,124	3,047	3,757	....	2,015,525	1,357,270	91,975	3,464,770
Franklin tp.	725		710		1,193,769	1,250	236,840	534,655	1,966,514
Garfield tp.		808		802	1,106,535	17,975	241,790	199,970	1,566,270
Grant tp.		1,065		1,096	1,803,883	....	355,075	8,215	2,162,173
Circleville	222	1,013	280	1,061	....	72,385	126,590	17,305	216,280
Jefferson tp.	791		781		1,087,050	....	204,625	385,994	1,677,669
Liberty tp.		660		645	1,238,647	....	262,603	273,690	1,774,940
Lincoln tp.	*			1,034	418,975	....	325,120	198	744,293
Netawaka	244	803	297	911	....	97,730	99,730	65,249	262,709
Netawaka tp.	559		614		1,125,335	....	161,895	189,572	1,476,802
Soldier	314	1,044	348	1,055	....	133,075	160,150	4,183	297,408
Soldier tp.	730		707		1,303,504	....	246,085	145,418	1,695,007
Straight Creek tp.		630		594	1,059,914	275	206,410	183,108	1,449,707
Washington tp.		657		890	1,471,513	47,991	279,515	263,691	2,062,710
Whiting	379	1,035	396	1,045	....	167,110	216,245	70,322	453,677
Whiting tp.	656		649		1,179,895	....	236,550	447,863	1,864,308
Pottawatomie res.		1,000	†		....	....	....	....	....

* Pottawatomie reservation now Lincoln township.
† Now Lincoln township.

SUMMARY.—JACKSON COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops .... acres	290,007	$1,896,725.88	334,994	$3,181,787.70
Animals slaughtered and sold for slaughter	....	1,107,326.00	....	1,033,896.00
Poultry and eggs sold	....	148,175.00	....	142,046.00
Wool clip .... lbs.	1,822	309.74	2,145	429.00
Cheese .... lbs.	152	19.76	60	8.40
Butter .... lbs.	230,004	55,200.96	250,851	62,712.75
Milk sold	....	90,505.00	....	97,463.00
Honey and beeswax .... lbs.	14,870	2,231.40	4,010	614.20
Wood marketed	....	1,481.00	....	1,608.00
Totals	....	$3,301,974.74	....	$4,520,565.05

LIVE STOCK.—JACKSON COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	12,030	$1,359,390.00	12,996	$1,468,548.00	161	379
Mules and asses	2,704	354,224.00	2,995	392,345.00	27	26
Milch cows	9,637	385,480.00	10,788	485,235.00	112	113
Other cattle	14,758	398,466.00	13,594	485,008.00	211	381
Sheep	4,144	17,404.80	2,187	9,294.75	76	15
Swine	34,879	348,790.00	29,860	298,600.00	2,266	8,591
Totals	78,152	$2,863,754.80	72,415	$3,089,030.75	2,853	9,505

Number of dogs in county March 1, 1911, 2016; March 1, 1912, 2398.
Number of sheep killed by dogs, year ending March 1, 1911, 9; March 1, 1912, 5.
Number of sheep killed by wolves, year ending March 1, 1911, 16; March 1, 1912, 5.

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JEFFERSON COUNTY.

Organized in 1855; area, 568 square miles; population, 15,837; rank in population, 40; assessed valuation, $30,266,308; miles of railroad, main track, 121.27; county seat, Oskaloosa, population, 1002.

POPULATION AND VALUATION.—JEFFERSON COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county		15,929		15,837	$18,068,480	$1,782,990	$5,702,780	$4,712,058	$30,266,308
Valley Falls	1,028	2,623	1,096	2,524	....	$522,430	$514,890	$100,100	$1,187,420
Delaware tp.	1,595		1,428		$2,974,550	....	513,140	1,034,992	4,522,682
Fairview tp.		687		690	645,770	....	168,860	490	814,620
Winchester	473	1,673	484	1,673	....	157,630	251,740	14,080	423,450
Jefferson tp.	1,200		1,189		2,337,470	....	520,710	291,596	3,149,776
Kaw tp.		721		720	1,104,120	....	248,790	592,180	1,945,090
Perry	391	1,348	400	1,369	....	117,360	136,820	106,360	360,540
Kentucky tp.	957		969		1,368,180	....	287,660	588,480	2,244,320
Nortonville	652	1,307	642	1,300	....	265,010	405,010	84,380	704,400
Norton tp.	655		658		1,680,510	....	302,990	169,790	2,153,290
Oskaloosa	1,005	2,201	1,002	2,207	....	374,470	330,710	140	705,320
Oskaloosa tp.	1,196		1,205		1,807,400	....	304,080	331,100	2,442,580
Ozawkie tp.		952		942	1,173,920	....	268,390	193,770	1,636,080
Meriden	543	1,696	514	1,665	....	138,640	200,150	34,670	373,460
Rock Creek tp.	1,153		1,151		1,671,980	....	366,080	529,790	2,567,850
Rural tp.		884		856	1,023,750	....	169,590	463,640	1,656,980
Sarcoxie tp.		585		586	736,490	....	132,230	590	869,310
McLouth	541	1,252	600	1,305	....	207,450	278,960	41,310	527,720
Union tp.	711		705		1,544,340	....	302,480	184,600	2,031,420

FARM AND CROP STATISTICS.—JEFFERSON COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat........bu.	29,922	598,440	$520,642.80	40,816	816,320	$693,872.00
Spring wheat........bu.	50	760	617.20	....	....	....
Corn................bu.	87,094	1,741,880	975,452.80	85,509	2,821,797	1,664,860.23
Oats................bu.	23,073	392,241	149,051.58	14,753	486,849	170,397.15
Rye.................bu.	88	1,760	1,408.00	305	6,710	5,032.50
Barley..............bu.	34	748	374.00	5	130	58.50
Emmer ("speltz")..bu.	4	80	36.00	....	....	....
Buckwheat...........bu.	....	....	....	4	48	48.00
Irish potatoes.......bu.	1,137	48,891	40,579.53	905	104,890	62,988.00
Sweet potatoes......bu.	5	390	339.30	16	1,840	1,472.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton..............lbs.	....	....	....	....	....	....
Flax................bu.	152	760	1,330.00	80	640	960.00
Tobacco.............lbs.	32	32,000	3,200.00	....	....	....
Broom-corn..........lbs.	....	....	....	1	650	29.25
Millet & hungarian, tons	1,367	2,734	17,771.00	1,780	4,005	20,025.00
Sugar-beets.........tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	787	68,469	32,865.12	1,019	94,767	42,645.15
forage or grain..tons	721	....	8,652.00	1,313	....	19,695.00
Milo maize..........tons	42	147	882.00	125	437	2,185.00
Kafir-corn..........tons	923	3,692	18,460.00	3,051	12,204	54,918.00
Jerusalem corn....tons	....	....	....	35	140	630.00

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FARM AND CROP STATISTICS.—JEFFERSON COUNTY.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Timothy..........tons	18,539	* 30,108	$361,236.00	16,054	† 13,645	$136,450.00
Clover............tons	13,492			8,036		
Blue-grass........tons	18,709			24,899		
Alfalfa...........tons	4,960			6,293		
Orchard-grass.....tons	95			29		
Other tame grasses, tons	789			333		
Prairie-grass fnc'd, tons	81,791	12,486	124,860.00	77,528	5,490	43,920.00
Totals.............	283,806	....	$2,257,757.33	282,889	....	$2,920,185.78

Corn on hand March 1, 1911, 757,584 bushels; March 1, 1912, 358,479 bushels.
Wheat on hand March 1, 1911, 25,822 bushels; March 1, 1912, 33,412 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—JEFFERSON COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops..........................acres	283,806	$2,257,757.33	282,889	$2,920,185.78
Animals slaughtered and sold for slaughter....	....	1,434,655.00	....	1,277,537.00
Poultry and eggs sold.....................	....	175,181.00	....	161,884.00
Wool clip..............................lbs.	8,452	1,436.84	12,724	2,544.80
Cheese.................................lbs.	18,482	2,957.12	18,500	3,330.00
Butter.................................lbs.	251,354	60,324.96	229,474	57,368.50
Milk sold.................................	....	123,687.00	....	114,889.00
Honey and beeswax......................lbs.	19,593	2,953.55	1,282	196.30
Wood marketed.............................	....	4,270.00	....	2,884.00
Totals....................................	....	$4,063,222.80	....	$4,540,819.88

LIVE STOCK.—JEFFERSON COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses....................	11,209	$1,266,617.00	10,665	$1,205,145.00	160	239
Mules and asses............	2,895	379,245.00	3,008	394,048.00	18	28
Milch cows................	8,584	343,360.00	9,906	445,770.00	95	105
Other cattle...............	17,753	479,331.00	14,770	472,640.00	122	190
Sheep.....................	3,223	13,536.60	3,017	12,822.25	45	54
Swine.....................	38,026	380,260.00	35,416	354,160.00	1,071	2,982
Totals................	81,690	$2,862,349.60	76,782	$2,884,585.25	1,511	3,598

Dogs in county March 1, 1911, 2569; March 1, 1912, 2497.
Number of sheep killed by dogs, year ending March 1, 1911, 13; March 1, 1912, 2.
Number of sheep killed by wolves, year ending March 1, 1911, 1.

JEWELL COUNTY.

Organized in 1870; area, 900 square miles; population, 17,822; rank in population, 35; assessed valuation, $37,560,000; miles of railroad, main track, 76.96; county seat, Mankato, population, 1260.

POPULATION AND VALUATION.—JEWELL COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county		18,036		17,822	$24,575,735	$2,365,100	$7,537,145	$3,082,020	$37,560,000
Allen tp		533		520	$1,070,600	....	$200,170	$148,868	$1,419,638
Athens tp		470		500	950,355	....	426,340	1,573	1,378,268
Browns Creek tp		494		445	1,153,815	....	204,765	3,063	1,361,643
Burr Oak	642	1,309	544	1,162	....	$361,695	441,470	28,516	831,681
Burr Oak tp	667		618		1,265,115	....	292,150	55,768	1,613,033
Jewell City	820	1,505	824	1,465	....	589,350	636,485	18,336	1,244,171
Buffalo tp	685		621		1,392,871	....	239,975	119,624	1,752,470
Calvin tp		438		387	741,243	....	167,400	90,207	998,850
Mankato	1,016	1,535	1,260	1,766	....	686,900	493,285	113,376	1,293,561
Center tp	519		506		971,785	....	173,300	418,181	1,563,266
Erving tp		446		494	712,855	....	155,530	2,048	870,433
Esbon	558	1,428	350	824	....	154,405	166,355	20,082	340,842
Esbon tp	870		474		995,967	....	135,265	296,516	1,427,748
Formoso	254	874	400	1,062	....	218,225	217,165	35,061	470,451
Grant tp	620		662		1,165,570	....	205,895	310,204	1,681,669
Harrison tp		539		529	872,330	....	257,240	....	1,129,570
Highland tp		545		550	882,880	....	219,895	17	1,102,792
Holmwood tp		479		499	942,740	....	230,000	33,847	1,206,587
Ionia tp		717		663	949,080	59,400	300,672	451	1,309,603
Jackson tp		642		689	1,104,873	40,385	223,880	121,488	1,490,626
Limestone tp		745		771	905,414	21,380	198,560	370,875	1,496,229
Montana tp		521		624	990,230	....	226,588	159,382	1,376,200
Odessa tp		449		589	631,559	....	154,960	330	786,849
Randall	349	935	326	876	....	172,460	97,150	11,070	280,680
Prairie tp	586		550		1,313,924	....	195,860	57,672	1,567,456
Richland tp		565		571	830,600	....	187,100	789	1,018,489
Sinclair tp		567		550	1,003,899	19,005	179,505	321,849	1,524,258
Vicksburg tp		548		561	1,068,310	....	207,390	999	1,276,699
Walnut tp		616		613	924,690	25,885	295,815	593	1,246,983
Washington tp		523		523	752,920	16,010	186,490	340,405	1,295,825
White Mound tp		613		589	982,110	....	220,490	830	1,203,430

FARM AND CROP STATISTICS.—JEWELL COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

	1911.			1912.		
	Acres.	**Product.**	**Value.**	**Acres.**	**Product.**	**Value.**
Winter wheat.......bu.	53,918	593,098	$504,183.30	70,487	1,198,279	$982.588.78
Spring wheat.......bu.	....	....	....	15	225	184.50
Corn..............bu.	198,838	2,519,894	1,511,936.40	171,912	5,157,360	2,578,680.00
Oats..............bu.	27,012	351,156	150,997.08	10,892	370,328	140,724.64
Rye...............bu.	75	450	369.00	173	2,941	2,088.11
Barley............bu.	30	....	....	100	2,500	1,125.00
Emmer ("speltz")..bu.	....	....	....	....	....	....
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	1,785	26,775	26,507.25	1,294	100,982	79,736.28
Sweet potatoes......bu.	1	23	28.75	....	....	....
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....

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FARM AND CROP STATISTICS.—JEWELL COUNTY.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Flax .... bu.						
Tobacco .... lbs.						
Broom-corn .... lbs.				20	11,000	$495.00
Millet & hungarian, tons	6,403	6,403	$44,821.00	6,278	12,556	62,780.00
Sugar-beets .... tons						
Sorghum for—						
syrup or sugar ... gals.	138	8,280	4,140.00	171	11,115	5,557.50
forage or grain .. tons	3,993		43,923.00	6,261		87,654.00
Milo maize .... tons	17	26	195.00	190	665	3,825.00
Kafir-corn .... tons	3,138	6,276	43,932.00	5,351	21,404	96,318.00
Jerusalem corn .... tons	5	10	70.00			
Timothy .... tons	21	* 57,863	578,630.00	40	† 34,680	277,440.00
Clover .... tons	52			8		
Blue-grass .... tons	82			74		
Alfalfa .... tons	58,613			58,984		
Orchard-grass ..... tons				8		
Other tame grasses, tons	103			12		
Prairie-grass fnc'd, tons	143,798	9,063	81,567.00	143,188	5,873	41,111.00
Totals	493,022		$2,991,249.78	475,458		$4,359,807.81

Corn on hand March 1, 1911, 1,589,859 bushels; March 1, 1912, 658,371 bushels.
Wheat on hand March 1, 1911, 72,689 bushels; March 1, 1912, 46,790 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—JEWELL COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops .... acres	493,022	$2,991,249.78	475,458	$4,359,807.81
Animals slaughtered and sold for slaughter		2,394,100.00		1,887,199.00
Poultry and eggs sold		315,450.00		287,877.00
Wool clip .... lbs.	9,272	1,576.24	3,720	744.00
Cheese .... lbs.	3	39		
Butter .... lbs.	452,692	108,646.08	417,145	104,286.25
Milk sold		126,970.00		135,848.00
Honey and beeswax .... lbs.	61,894	9,339.40	8,277	1,252.55
Wood marketed		914.00		682.00
Totals		$5,948,245.89		$6,777,696.61

LIVE STOCK.—JEWELL COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	19,586	$2,213,218.00	19,094	$2,157,622.00	365	565
Mules and asses	4,641	607,971.00	4,907	642,817.00	34	34
Milch cows	10,556	422,240.00	11,394	512,730 00	139	179
Other cattle	24,036	648,972.00	16,302	521,664.00	588	499
Sheep	11,877	49,883.40	708	3,009.00	10	15
Swine	88,989	889,890.00	57,771	577,710.00	6,259	18,459
Totals	159,685	$4,832,174.40	110,176	$4,415,552.00	7,395	19,751

Number of dogs in county March 1, 1911, 3119; March 1, 1912, 2761.
Number of sheep killed by dogs, year ending March 1, 1911, 1; March 1, 1912, 18.
Number of sheep killed by wolves, year ending March 1, 1911, 23; March 1, 1912, 2.

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JOHNSON COUNTY.

Organized in 1855; area, 480 square miles; population, 17,985; rank in population, 34; assessed valuation, $36,992,380; miles of railroad, main track, 93.70; county seat, Olathe, population, 3387.

POPULATION AND VALUATION.—JOHNSON COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......		17,721		17,985	$20,240,120	$4,437,970	$4,270,335	$8,043,955	$36,992,380
Aubrey tp.........		1,080		982	$1,700,445	$45,500	$277,595	$478,479	$2,502,019
Gardner..........	449	1,261	450	1,237	....	203,815	256,740	15,431	475,486
Gardner tp........	812		787		1,929,145	....	228,965	590,145	2,748,255
De Soto...........	312	1,824	308	1,910	....	135,560	79,825	47,698	263,083
Lexington tp......	1,512		1,602		1,992,800	6,550	311,910	561,987	2,873,247
Edgerton..........	307	1,091	312	1,099	....	88,625	87 035	34,804	210,464
McCamish tp......	784		787		1,704,545	....	328,830	610,082	2,643,457
Mission tp........		1,479		1,647	2,536,780	677,720	342,600	452,498	4,009,598
Monticello tp......		1,131		1,143	1,462,825	27,665	181,360	1,324,317	2,996,167
Olathe............	3,444	4,645	3,387	4,647	....	2,062,400	815,275	217,020	3,094,695
Olathe tp..........	1,201		1,260		2,661,010	75,875	305,875	1,556,109	4,59 .869
Oxford tp..........		1,438		1,481	2,771,545	64,850	399,570	767,799	4,003,764
Lenexa............	407	2,587	433	2,627	....	208,195	45,100	67,022	320,817
Shawnee tp........	2,180		2,194		2,221,685	592,950	204,430	1,001,064	4,020,079
Springhill.........	588	1,185	618	1,212	....	243,115	225,320	41,234	509,669
Springhill tp......	597		594		1,259,390	5,650	179,905	278,266	1,723,211

FARM AND CROP STATISTICS.—JOHNSON COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	45,463	681,945	$613,750.50	56,063	1,177,323	$1,106,683.62
Spring wheat.......bu.	92	1,136	952.00	11	210	180.30
Corn...............bu.	65,630	1,181,340	708,804.00	57,681	2,018,835	1,211,301.00
Oats...............bu.	24,100	289,200	127,248.00	13,998	475,932	171,335.52
Rye................bu.	59	885	752.25	133	2,660	2,021.60
Barley.............bu.	103	1,854	1,019.70	25	700	315.00
Emmer ("speltz")..bu.	....	....	....	....	....	....
Buckwheat.........bu.	28	280	280.00	55	715	715.00
Irish potatoes.......bu.	2,101	77,737	69,963.30	1,962	235,440	138,909.60
Sweet potatoes......bu.	143	10,010	9,509.50	113	14,690	12,633.40
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	1,624	8,120	14,616.00	445	3,560	5,340.00
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	1	500	32.50	....	....	....
Millet & hungarian, tons	81	122	854.00	250	625	3,125.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	30	2,100	1,050.00	77	5,775	2,772.00
forage or grain..tons	128	....	2,304.00	536	....	8,040.00
Milo maize........tons	60	180	1,080.00	156	546	3,003.00
Kafir-corn........tons	242	726	3,993.00	612	2,448	12,240.00
Jerusalem corn....tons	5	15	83.00	....	....	....

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FARM AND CROP STATISTICS.—JOHNSON COUNTY.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Timothy..........tons	16,994	* 24,109	$289,308.00	13,536	† 5,994	65,934.00
Clover............tons	10,343			7,086		
Blue-grass........tons	15,566			14,986		
Alfalfa...........tons	1,682			2,306		
Orchard-grass.....tons	14			38		
Other tame grasses, tons	890			1,851		
Prairie-grass fnc'd, tons	57,762	3,011	30,110.00	59,957	1,197	10,773.00
Totals.............	243,141	....	$1,875,709.75	231,877	....	$2,755,322.04

Corn on hand March 1, 1911, 479,660 bushels; March 1, 1912, 156,401 bushels.
Wheat on hand March 1, 1911, 69,608 bushels; March 1, 1912, 51,297, bushels.
* Product of 1910. † Product of 1911.

SUMMARY.—JOHNSON COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops.............................acres	243,141	$1,875,709.75	231,877	$2,755,322.04
Animals slaughtered and sold for slaughter....	....	742,990.00	....	545,455.00
Poultry and eggs sold..........................	....	121,755.00	....	107,001.00
Wool clip.................................lbs.	19,936	3,389.12	13,832	2,766.40
Cheese....................................lbs.	500	65.00	1,500	210.00
Butter....................................lbs.	346,436	85,549.68	314,506	79,126.50
Milk sold......................................	....	154,537.00	....	146,718.00
Honey and beeswax.........................lbs.	11,799	1,788.85	4,370	655.50
Wood marketed..................................	....	978.00	... .	1,414.00
Totals...	....	$2,986,762.40	....	$3,638,668.44

LIVE STOCK.—JOHNSON COUNTY.

Table showing number, value and mortality oı live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses......................	10,263	$1,159,719.00	9,718	$1,097,569.00	171	330
Mules and asses.............	2,477	324,487.00	2,450	320,950.00	21	26
Milch cows..................	8,735	349,400.00	8,011	360,495.00	93	141
Other cattle................	9,383	253,341.00	6,979	223,328.00	72	117
Sheep.......................	6,715	28,203.00	3,823	16,247.75	579	115
Swine.......................	30,144	301,440.00	16,845	168,450.00	1,999	8,969
Totals......................	67,717	$2,416,590.00	47,821	$2,187,039.75	2,935	9,698

Number of dogs in county March 1, 1911, 2166; March 1, 1912, 1971.
Number of sheep killed by dogs, year ending March 1, 1911, 26; March 1, 1912, 12.
Number of sheep killed by wolves, year ending March 1, 1911, 41; March 1, 1912, 67.

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KEARNY COUNTY.

Organized in 1888; area, 864 square miles; population, 2431; rank in population, 96; assessed valuation, $5,171,680; miles of railroad, main track, 26.47; county seat, Lakin, population, 435.

POPULATION AND VALUATION.—KEARNY COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......	2,987	2,431	$2,838,145	$195,828	$715,147	$1,422,560	$5,171,680
Hartland tp.......	352	267	$334,285	$4,240	$55,490	$346,375	$740,390
Hibbard tp........	702	556	740,995	....	69,725	....	810,720
Kendall tp........	377	272	321,450	....	68,855	343,025	733,330
Deerfield.........	160	153	....	47,305	62,810	55,885	165,500
Lakin............	444 } 1,343	435 } 1,122	....	144,283	166,462	79,925	390,670
Lakin tp..........	739	534	892,935	....	148,585	596,290	1,637,810
Southside tp......	213	214	548,480	....	148,720	1,060	693,260

FARM AND CROP STATISTICS.—KEARNY COUNTY.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	889	4,445	$3,822.70	4,037	48,444	$37,301.88
Spring wheat.......bu.	790	2,325	1,819.80	80	880	616.00
Corn...............bu.	2,822	14,110	8,466.00	1,379	31,717	16,810.01
Oats...............bu.	1,703	15,327	6,897.15	1,529	45,870	19,724.10
Rye................bu.	107	535	449 40	80	1,120	795.20
Barley.............bu.	1,841	11,046	5,523.00	1,596	33,516	15,417.36
Emmer ("speltz")..bu.	141	423	211.50	15	300	144.00
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	37	592	698.56	9	540	486.00
Sweet potatoes......bu.	....	....	....	1	100	100.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	5	....	....	5	30	45.00
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	5,008	751,200	37,560.00	4,581	1,717,875	51,536.25
Millet & hungarian, tons	1,048	1,048	8,384.00	429	643	3,215.00
Sugar-beets.......tons	1,142	6,281	31,405.00	2,271	22,710	124,905.00
Sorghum for—						
syrup or sugar...gals.	129	5,160	2,580.00	57	3,705	1,852.50
forage or grain..tons	7,435	....	59,480.00	5,080	....	45,720.00
Milo maize........tons	7,875	11,813	94,504.00	5,801	14,502	72,510.00
Kafir-corn........tons	3,095	4,643	34,823.00	3,300	9,900	44,550.00
Jerusalem corn....tons	778	1,167	8,753.00	439	1,317	5,926.50
Timothy..........tons	....	* 8,531	93,841.00	....	† 4,333	36,830.50
Clover............tons	27			....		
Blue-grass........tons	....			....		
Alfalfa...........tons	4,725			5,062		
Orchard-grass.....tons	....			....		
Other tame grasses, tons	....			....		
Prairie-grass fnc'd, tons	56,613	1,003	10,030.00	44,215	502	3,514.00
Totals..............	96,210	....	$409,248.11	79,966	....	$481,999.30

Corn on hand March 1, 1911, 1050 bushels; March 1, 1912, 160 bushels.
Wheat on hand March 1, 1911, 520 bushels; March 1, 1912, 40 bushels.

*** Product of 1910. † Product of 1911.**

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SUMMARY.—KEARNY COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops ....acres	96,210	$409,248.11	79,966	$481,999.80
Animals slaughtered and sold for slaughter....	....	41,856 00	....	19,082 00
Poultry and eggs sold....	....	10,535.00	....	6,975.00
Wool clip....lbs.	5	85	250	50.00
Cheese....lbs.	85	4.55	100	14.00
Butter....lbs.	42,199	10,127.76	35,405	8,851.25
Milk sold....	....	7,668.00	....	8,758.00
Honey and beeswax....lbs.	1,600	240.00	3,950	602.50
Wood marketed....	....	....	....	....
Totals....	......	$479,680.27	....	$526,332.05

LIVE STOCK.—KEARNY COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses....	3,537	$399,681.00	3,207	$362,391.00	93	66
Mules and asses....	676	88,556.00	746	97,726.00	5	6
Milch cows....	2,988	119,520.00	3,056	137,520.00	25	40
Other cattle....	7,157	193,239.00	8,282	265,024.00	109	89
Sheep....	139	583.80	309	1,313.25	....	202
Swine....	1,031	10,310.00	585	5,850.00	7	22
Totals....	15,528	$811,889.80	16,185	$869,824.25	239	425

Number of dogs in county March 1, 1911, 539; March 1, 1912, 458.

KINGMAN COUNTY.

Organized in 1873; area, 864 square miles; population, 12,336; rank in population, 53; assessed valuation, $29,279,120; miles of railroad, main track, 146.65; county seat, Kingman, population, 2170.

POPULATION AND VALUATION.—KINGMAN COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county....	12,415	12,336	$17,164,819	$1,911,071	$5,338,015	$4,865,215	$29,279,120
Allen tp....	237	256	$769,313	....	$110,395	$46,008	$925,716
Belmont tp....	353	343	782,505	....	135,267	769	918,541
Norwich....	368 } 723	361 } 707	....	$86,060	156,265	42,851	285,176
Bennett tp....	355 }	346 }	744,863	....	135,415	431,233	1,311,511
Canton tp....	308	353	516,665	....	131,176	225,849	873,690
Chicaskia tp....	476	461	563,569	43,902	189,597	245,320	1,042,388
Dale tp....	399	425	669,872	20,632	153,374	222,164	1,066,042
Dresden tp....	493	523	676,814	....	83,977	37,926	798,717
Eagle tp....	454	442	694,426	34,013	179,952	178,523	1,086,914

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POPULATION AND VALUATION.—KINGMAN COUNTY.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
Eureka tp.		501		456	$721,156	$39,744	$211,692	$153,178	$1,125,770
Evan tp.		409		462	886,218	....	123,527	1,147	1,010,892
Galesburg tp.		458		451	911,617	2,510	179,205	2,852	1,096,184
Hoosier tp.		518		507	871,255	....	172,037	169,466	1,212,758
Kingman tp.		372		361	671,682	....	130,813	1,642	804,137
Liberty tp.		476		454	604,599	40,168	282,165	238,508	1,165,440
Kingman:									
1st ward	770								
2d ward	664	2,797	*2,170	2,698	....	1,463,355	1,058,165	154,208	2,675,728
3d ward	521								
4th ward	301								
Ninnescah tp.	541		528		1,110,972	....	236,685	628,632	1,976,289
Peters tp.		392		391	692,374	....	189,804	1,227	883,405
Richland tp.		437		465	766,681	11,815	180,941	337,460	1,297,077
Rochester tp.		502		497	610,101	53,925	260,251	234,348	1,158,625
Rural tp.		425		478	818,398	99,745	336,777	183,644	1,438,564
Union tp.		319		354	614,831	3,118	230,217	214,192	1,062,358
Valley tp.		355		322	549,719	5,671	85,703	455,174	1,096,267
Vinita tp.		400		377	983,148	....	156,968	212,394	1,352,510
White tp.		611		553	933,861	6,418	227,647	446,500	1,614,421

* Population not given by wards in 1912.

FARM AND CROP STATISTICS.—KINGMAN COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	77,883	856,713	$762,474.57	123,032	1,968,512	$1,614,179.84
Spring wheat.......bu.	....	....	....	....	....	....
Corn...............bu.	124,831	1,622,803	924,997.71	77,230	1,699,060	849,530.00
Oats...............bu.	52,649	1,158,278	463,311.20	24,516	661,932	251,534.16
Rye................bu.	1,456	18,928	16,088.80	3,911	50,843	35,590.10
Barley.............bu.	35	420	210.00	48	1,056	475.20
Emmer ("speltz")..bu.	....	....	....	....	....	....
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	357	7,140	8,710.80	281	28,100	22,480.00
Sweet potatoes......bu.	4	424	534.24	6	600	600.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	....	....	....	91	45,500	1,820.00
Millet & hungarian, tons	942	1,413	9,891.00	838	1,466	7,696.50
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	32	1,600	800.00	57	3,990	1,995.00
forage or grain..tons	7,101	....	49,707.00	4,129	....	41,290.00
Milo maize........tons	102	306	1,989.00	674	2,022	11,121.00
Kafir-corn........tons	14,777	44,331	265,986.00	25,195	75,585	377,925.00
Jerusalem corn....tons	....	....	....	....	....	....
Timothy...........tons	....			11		
Clover............tons	10			3		
Blue-grass........tons	2			15		
Alfalfa...........tons	5,271	* 3,343	33,430.00	5,399	† 5,181	46,629.00
Orchard-grass.....tons	....			3		
Other tame grasses, tons	32			18		
Prairie-grass fnc'd, tons	153,326	8,284	66,272.00	162,582	8,738	65,535.00
Totals............	438,810	....	$2,604,402.32	428,039	....	$3,328,400.80

Corn on hand March 1, 1911, 138,589 bushels; March 1, 1912, 163,460 bushels.
Wheat on hand March 1, 1911, 111,081 bushels; March 1, 1912, 15,432 bushels.

*** Product of 1910. † Product of 1911.**

SUMMARY.—KINGMAN COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops .... acres	438,810	$2,604,402.32	428,039	$3,328,400.80
Animals slaughtered and sold for slaughter....	....	853,565.00	....	600,286.00
Poultry and eggs sold..........................	....	84,315.00	....	80,525.00
Wool clip............................ lbs.	20	3.40	356	71.20
Cheese................................ lbs.	....	....	....	....
Butter................................ lbs.	220,160	53,198.40	203,243	51,210.75
Milk sold..	....	59,261.00	....	73,320.00
Honey and beeswax................... lbs.	752	113 50	160	24.00
Wood marketed.................................	....	239.00	....	222.00
Totals..	....	$3,655,097.62	....	$4,184,059.75

LIVE STOCK.—KINGMAN COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number	Value.	Number.	Value.	1911.	1912.
Horses..........................	12,672	$1,431,936.00	12,516	$1,414,308.00	172	388
Mules and asses..............	3,369	441,339.00	3,575	468,825.00	24	21
Milch cows.....................	9,868	394,720 00	11,408	513,360.00	87	187
Other cattle....................	21,629	583,983.00	22,701	726,482.00	254	816
Sheep	541	2,272.20	251	1,066.75	....	18
Swine.............................	20,820	203,200.00	16.505	165,050.00	584	4,195
Totals............................	68.399	$3,057,450.20	66.956	$3,288,541.75	1,071	5,620

Number of dogs in county March 1, 1911, 2110; March 1, 1912, 1882.
Number of sheep killed by dogs. year ending March 1, 1911, 7; March 1, 1912, 1.
Number of sheep killed by wolves, year ending March 1, 1911, 2; March 1, 1912, 10.

KIOWA COUNTY.

Organized in 1886; area, 720 square miles; population, 6063; rank in population, 79; assessed valuation, $15,512,528; miles of railroad, main track, 44.97; county seat, Greensburg, population, 1128.

POPULATION AND VALUATION.—KIOWA COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......	6,106	6,063	$9,982,528	$993,265	$2,608,851	$1,927,884	$15,512,528
Brenham tp.......	322	309	$986,798	....	$150,388	$262,302	$1,399,488
Butler tp..........	301	316	526,693	....	136,397	205	663,295
Greensburg.......	1,136 } 1,375	1,128 } 1,338	....	$639,125	401,642	67,517	1,108,284
Center tp..........	239	210	849,379	3,315	106,925	202,212	1,161,831
Garfield tp........	240	276	746,837	....	75,553	262,568	1,084,958
Glick tp............	177	139	583,564	2,490	206,105	588,436	1,330,595

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POPULATION AND VALUATION.—KIOWA COUNTY.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
Kiowa tp.		262		281	$626,848	....	$103,731	....	$730,579
Lincoln tp.		286		284	432,552	....	109,699	....	542,251
Mullinville	*....	896	*....	961	1,585,836	$72,560	411,318	$270,724	2,340,438
Martin	896		961						
Reeder tp.		221		220	495,272	....	86,093	....	581,365
Union tp.		219		218	432,455	....	73,026	....	505,481
Ursula tp.		477		503	1,028,294	....	209,928	....	1,238,222
Valley tp.		259		261	549,434	....	62,048	....	611,482
Haviland	586	1,071	553	962	....	265,590	264,660	12,700	542,950
Wellsford tp.	485		409		1,188,566	10,185	211,343	261,220	1,671,314

* Not shown separately from township in 1911 or 1912.

FARM AND CROP STATISTICS.—KIOWA COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	132,944	1,861,216	$1,637,870.08	139,987	2,959,818	$2,338,256.22
Spring wheat.......bu.	110	1,320	1,122.00	....	....	....
Corn...............bu.	53,584	857,344	471,539.20	44,496	800,928	432,501.12
Oats...............bu.	6,179	86,506	38,927.70	4,325	108,125	46,493.75
Rye................bu.	18	270	216.00	380	5,320	3,724.00
Barley.............bu.	4,915	73,725	36,862.50	2,158	53,950	24,277.50
Emmer ("speltz")..bu.	....	....	....	....	....	....
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	101	3,333	4,166.25	77	4,851	4,123.35
Sweet potatoes......bu.	1	70	87.50	....	....	....
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	....	....	....	5	2,250	67.50
Millet & hungarian, tons	113	226	1,582.00	34	68	374.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	....	....	....	108	7,560	3,780.00
forage or grain..tons	3,575	....	25,025.00	6,373	....	70,103.00
Milo maize........tons	1,252	3,130	18,780.00	308	770	4,235.00
Kafir-corn........tons	16,488	49,464	247,320.00	12,858	38,574	192,870.00
Jerusalem corn....tons	10	30	150.00	....	....	....
Timothy..........tons	1	* 964	9,640.00	....	† 908	8,172.00
Clover............tons	1			....		
Blue-grass........tons	2			....		
Alfalfa...........tons	665			787		
Orchard-grass.....tons	....			....		
Other tame grasses, tons	....			....		
Prairie-grass fnc'd, tons	186,782	1,325	11,925.00	218,118	714	4,998.00
Totals..............	406,741	....	$2,505,213.23	430,014	....	$3,133,975.44

Corn on hand March 1, 1911, 250,012 bushels; March 1, 1912, 178,955 bushels.
Wheat on hand March 1, 1911, 151,144 bushels; March 1, 1912, 38,651 bushels.

*** Product of 1910. † Product of 1911.**

SUMMARY.—KIOWA COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops ....acres	406,741	$2,505,213.23	430,014	$3,133,975.44
Animals slaughtered and sold for slaughter....	....	351,247.00	....	296,271.00
Poultry and eggs sold........................	....	28,358.00	....	28,558.00
Wool clip.............................lbs.	1,700	289.00	....	....
Cheese................................lbs.	....	....	....	....
Butter................................lbs.	106,049	25,454.16	96,513	24,128.25
Milk sold....................................	....	12,491.00	....	4,460.00
Honey and beeswax....................lbs.	....	....	....	....
Wood marketed................................	....	175.00	....	....
Totals.......................................	......	$2,923,227.39	....	$3,487,892.69

LIVE STOCK.—KIOWA COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses..........................	6,725	$759,925.00	6,956	$786,028.00	170	233
Mules and asses.................	2,733	358,028.00	2,900	379,900.00	16	18
Milch cows......................	5,065	202,600.00	5,252	236,340.00	36	39
Other cattle....................	12,289	331,803.00	11,591	370,912.00	106	160
Sheep...........................	16	67.20	21	89.25	40	40
Swine...........................	6,331	63.810.00	5,918	59,180.00	787	440
Totals..........................	33,159	$1,715,728.20	32.638	$1,882,449.25	1,155	930

Number of dogs in county, March 1, 1911, 984; March 1, 1912, 891.
Number of sheep killed by dogs, year ending March 1, 1911, 25.
Number of sheep killed by wolves, year ending March 1, 1911, 25.

LABETTE COUNTY.

Organized in 1867; area, 649 square miles; population, 34,196; rank in population, 9; assessed valuation, $35,381,695; miles of railroad, main track, 150.19; county seat, Oswego, population, 2793.

POPULATION AND VALUATION.—LABETTE COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......	34,163	34,196	$11,600,149	$9,625,921	$5,815,776	$8,339,849	$35,381,695
Canada tp........	612	600	$688,143	$8,420	$153,355	$377,754	$1,227,672
Edna.............	554 } 1,514	572 } 1,478	....	158,090	226,818	19,288	404,196
Elm Grove tp.....	960	906	851,247	510	171,640	179,314	1,202,711
Fairview tp......	621	627	624,066	....	109,222	344,018	1,077,306
Bartlett.........	254 } 1,162	232 } 1,117	....	72,845	82,754	10,298	165,897
Hackberry tp.....	908	885	882,185	....	194,580	204,915	1,281,680
Howard tp........	998	969	710,620	9,385	140,735	272,171	1,132,911

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POPULATION AND VALUATION.—LABETTE COUNTY.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
Labette tp........		692		702	$642,095	$330	$142,965	$310,899	$1,096,279
Liberty tp........		974		992	672,020	29,015	184,245	426,998	1,312,278
Montana tp.......		693		692	443,874	9,805	172,870	148,408	773,957
Mound Valley.....	963	2,230	977	2,226	....	301,276	200,390	76,069	577,735
Mound Valley tp..	1,267		1,249		1,189,470	....	243,350	808,811	2,241,631
Altamont.........	582	1,247	603	1,220	....	160,265	168,841	39,741	368,347
Mount Pleasant tp.	665		617		663,845	....	131,912	313,630	1,108,887
Neosho tp........		567		559	497,653	....	89,970	164,287	751,910
Parsons..........	13,847	14,772	13,790	14,743	....	7,478,625	2,020,896	2,053,625	11,553,146
North tp.........	925		953		776,114	9,120	179,946	450,789	1,415,969
Osage tp.........		1,301		1,327	1,059,246	27,370	236,402	445,320	1,768,338
Oswego...........	2,688	3,207	2,793	3,338	....	736,390	344,982	140,484	1,221,856
Oswego tp........	569		545		448,228	....	76,407	503,526	1,028,161
Chetopa..........	1,759	2,630	1,757	2,640	....	451,285	221,737	75,747	748,769
Richland tp.......	871		883		693,670	5,750	166,100	522,978	1,388,498
Walton...........		943		966	758,673	167,440	156,669	450,779	1,533,561

FARM AND CROP STATISTICS.—LABETTE COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	16,571	231,994	$199,514.84	30,920	371,040	$307,963.20
Spring wheat.......bu.	....	....	....	70	818	650.14
Corn...............bu.	81,640	1,387,880	791,091.60	81,002	1,053,026	579,164.30
Oats...............bu.	59,558	893,370	357,348.00	39,218	902,014	351,785.46
Rye................bu.	173	1,730	1,453.20	112	1,680	1,260.00
Barley.............bu.	53	848	466 40	3	60	27.00
Emmer ("speltz")..bu.	....	....	....	....	....	....
Buckwheat..........bu.	3	24	24.00	22	198	198.00
Irish potatoes.......bu.	544	8,160	8,160.00	310	18,600	14,880.00
Sweet potatoes......bu.	110	6,160	7,700.00	110	6,380	6,380.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton..............lbs.	....	....	....	....	....	....
Flax...............bu.	755	2,265	4,077.00	642	4,494	6,741.00
Tobacco............lbs.	1	800	80 00	1	700	70.00
Broom-corn........lbs.	297	148,500	10,395.00	407	183,150	7,326.00
Millet & hungarian, tons	522	783	5,481.00	1,023	1,278	6,390.00
Sugar-beets.......tons	....	....	....	1	8	40.00
Sorghum for—						
syrup or sugar...gals.	496	38,688	19,344.00	202	10,100	5,050.00
forage or grain..tons	1,674	....	16,740 00	3,289	....	29,601.00
Milo maize........tons	147	441	2,646 00	910	1,820	9,100.00
Kafir-corn........tons	8,909	35,636	195,998.00	20,842	41,684	208,420.00
Jerusalem corn....tons	21	84	462.00	9	18	90.00
Timothy...........tons	13,704	* 16,096	198,152.00	4,292	† 7,288	65,547.00
Clover............tons	4,393			1,958		
Blue-grass........tons	2,322			2,414		
Alfalfa...........tons	1,279			1,818		
Orchard-grass.....tons	166			55		
Other tame grasses, tons	3,545			1,411		
Prairie-grass fnc'd, tons	113,891	20,848	166,784.00	116,089	20,667	155,002.50
Totals............	310,774	....	$1,980,917 04	307,130	....	$1,755,685.60

Corn on hand March 1, 1911, 281,717 bushels; March 1, 1912, 199,978 bushels.
Wheat on hand March 1, 1911, 9,225 bushels; March 1, 1912, 4,620 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—Labette County.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops ..... acres	310,774	$1,980,917.04	307,130	$1,755,685.60
Animals slaughtered and sold for slaughter	.....	726,393.00	.....	737,907.00
Poultry and eggs sold	.....	179,539.00	.....	166,989.00
Weol clip ..... lbs.	16,659	2,832.03	14,999	2,999.80
Cheese ..... lbs.	3,400	442.00	2,455	343.70
Butter ..... lbs.	682,088	175,701.12	582,082	152,675.50
Milk sold	.....	106,054.00	.....	138,456.00
Honey and beeswax ..... lbs.	7,217	1,082.55	1,705	255.75
Wood marketed	.....	1,757.00	.....	2,164.00
Totals	.....	$3,174,717.74	.....	$2,957,476.35

LIVE STOCK.—Labette County.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	11,803	$1,333,789.00	12,019	$1,358,147.00	433	437
Mules and asses	3,240	424,440.00	3,294	431,514.00	35	33
Milch cows	10,850	434,000.00	11,981	539,145.00	319	341
Other cattle	18,742	506,034.00	18,077	578,464.00	817	881
Sheep	4,465	18,753 00	4,612	19,601.00	441	341
Swine	29,045	290,450.00	24,588	245,880.00	1,193	4,310
Totals	78,145	$3,007,416.00	74,571	$3,172,751.00	3,238	6,343

Number of dogs in county March 1, 1911, 3068; March 1, 1912, 3075.
Number of sheep killed by dogs, year ending March 1, 1911, 25; March 1, 1912, 48.
Number of sheep killed by wolves, year ending March 1, 1911, 22; March 1, 1912, 55.

LANE COUNTY.

Organized in 1886; area, 720 square miles; population, 2154; rank in population, 98; assessed valuation, $5,964,156; miles of railroad, main track, 48.92; county seat, Dighton, population, 315.

POPULATION AND VALUATION.—Lane County.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county	2,473	2,154	$3,080,366	$195,508	$935,890	$1,752,392	$5,964,156
Alamota tp	275	244	$360,374	$72	$107,122	$265,329	$732,897
Blaine tp	273	232	429,949	404	106,580	252,861	789,794
Cheyenne tp	383	308	356,302	33,404	143,498	330,071	863,275
Cleveland tp	138	107	275,698	.....	45,339	.....	321,032
Dighton	370 } 640	315 } 578	.....	154,973	161,713	42,775	359,461
Dighton tp	270	268	483,518	1,310	90,823	228,770	804,421
Spring Creek tp	183	170	250,841	.....	63,730	.....	314,571
Sutton tp	135	132	280,479	.....	67,683	.....	348,162
White Rock tp	205	163	307,644	.....	83,466	314,461	705,571
Wilson tp	241	220	335,566	5,345	65,936	318,125	724,972

FARM AND CROP STATISTICS.—LANE COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	6,252	6,252	$5,376.72	43,472	217,360	$163,020.00
Spring wheat.......bu.	178	....	....	25	125	93.75
Corn..............bu.	19,409	....	....	8,488	127,320	68,752.80
Oats..............bu.	8,379	....	....	4,443	66,645	27,990.90
Rye...............bu.	247	....	....	155	1,550	1,100.50
Barley............bu.	4,948	9,896	5,541.76	3,490	73,290	29,316.00
Emmer ("speltz")..bu.	1,538	....	....	323	3,876	1,938.00
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	158	....	....	105	4,620	4,158.00
Sweet potatoes......bu.	....	....	....	....	....	....
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	265	53,000	2,915.00	10	4,000	100.00
Millet & hungarian, tons	2,503	1,877	15,016.00	2,126	3,720	19,530.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	....	....	....	10	600	300.00
forage or grain..tons	23,856	....	143,136.00	14,478	....	115,824.00
Milo maize........tons	7,629	5,722	45,776.00	4,494	8,988	49,434 00
Kafir-corn........tons	5,184	7,776	62,208.00	4,204	8,408	42,040.00
Jerusalem corn....tons	100	150	1,200.00	5	10	50.00
Timothy..........tons	....	* 5,678	65,297.00	....	† 3,212	25,696.00
Clover............tons	....			....		
Blue-grass........tons	....			....		
Alfalfa...........tons	2,751			2,248		
Orchard-grass.....tons	....			....		
Other tame grasses, tons	....			....		
Prairie-grass fnc'd, tons	136,720	440	3,960.00	160,299	687	3,778.50
Totals............	220,117	....	$350,426.48	248,375	....	$553,122.45

Corn on hand March 1, 1911, 10,025 bushels; March 1, 1912, 100 bushels.
Wheat on hand March 1, 1911, 34,280 bushels; March 1, 1912, 2795 bushels.
*** Product of 1910. † Product of 1911.**

SUMMARY.—LANE COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops..........................acres	220,117	$350,426.48	248,375	$553,122.45
Animals slaughtered and sold for slaughter....	....	46,016.00	....	39,841.00
Poultry and eggs sold........................	....	26,705.00	....	18,137.00
Wool clip..............................lbs.	2,780	472.60	100	20.00
Cheese.................................lbs.	....	....	....	....
Butter.................................lbs.	56,712	13,610.88	41,950	10,487.50
Milk sold..................................	....	19,296.00	....	21,977.00
Honey and beeswax......................lbs.	60	9.00	....	....
Wood marketed..............................	....	....	....	....
Totals..................................	....	$456,534.96	....	$643,584.95

LIVE STOCK.—Lane County.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	4,701	$531,218.00	4,555	$514,715.00	66	116
Mules and asses	948	124,188.00	895	117,245.00	6	2
Milch cows	2,615	104,600.00	2,517	113,265.00	12	55
Other cattle	5,874	158,598.00	4,141	132,512.00	74	150
Sheep	565	2,373.00	72	306.00	4	....
Swine	1,785	17,850.00	1,148	11,480.00	3	22.
Totals	16,488	$938,822.00	13,328	$889,523.00	165	345

Number of dogs in county March 1, 1911, 434; March 1, 1912, 372.
Number of sheep killed by dogs, year ending March 1, 1911, 1.

LEAVENWORTH COUNTY.

Organized in 1855; area, 455 square miles; population, 40,119; rank in population, 6; assessed valuation, $42,221,059; miles of railroad, main track, 163.71; county seat, Leavenworth, population, 22,353.

FARM AND CROP STATISTICS.—Leavenworth County.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	40,533	607,995	$547,195.50	46,234	970,914	$873,822.60
Spring wheat.......bu.	....	....	....	....	....	....
Corn...............bu.	49,486	989,720	574,037.60	46,048	1,703,776	1,039,303.36
Oats...............bu.	13,862	235,654	98,974.68	8,195	303,215	127,351.30
Rye................bu.	142	2,130	1,810.50	206	4,738	3,458.74
Barley.............bu.	176	3,344	1,839.20	33	924	425.04
Emmer ("speltz")..bu.	....	....	....	....	....	....
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	2,107	80,066	70,458.08	1,473	160,557	104,362.05
Sweet potatoes......bu.	39	2,925	2,954.25	41	4,756	4,280.40
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	75	375	656.25	....	....	....
Tobacco............lbs.	66	66,000	6,600.00	39	62,400	6,240.00
Broom-corn........lbs.	20	10,000	650.00	....	....	....
Millet & hungarian, tons	898	1,347	9,429.00	1,125	2,250	11,250.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	1,049	83,920	37,764.00	875	65,625	29,531.25
forage or grain..tons	640	....	9,600.00	936	....	14,040.00
Milo maize........tons	9	27	162.00	32	96	528.00
Kafir-corn........tons	214	856	4,280.00	800	3,200	16,000.00
Jerusalem corn....tons	9	36	180.00	21	84	420.00
Timothy..........tons	10,369	* 21,311	255,732.00	8,097	† 6,014	66,154.00
Clover............tons	7,325			3,696		
Blue-grass........tons	31,107			25,288		
Alfalfa...........tons	2,340			6,348		
Orchard-grass.....tons	45			64		
Other tame grasses, tons	927			1,360		
Prairie-grass fnc'd, tons	53,789	5,441	54,410.00	58,367	1,719	16,330.50
Totals	215,227	....	$1,676,733.06	209,278	....	$2,313,497.24

Corn on hand March 1, 1911, 275,680 bushels; March 1, 1912, 74,372 bushels.
Wheat on hand March 1, 1911, 53,280 bushels; March 1, 1912, 42,630 bushels.
*** Product of 1910. † Product of 1911.**

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POPULATION AND VALUATION.—LEAVENWORTH COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county		40,212		40,119	$13,979,380	$11,684,515	$7,862,270	$8,694,894	$42,221,059
Alexandria tp		1,016		973	$1,323,332	$17,410	$183,530	$55,148	$1,579,420
Lansing	727	6,793	960	6,927	1,282,434	378,735	270,230	1,628,750	3,560,149
Delaware tp	6,066		5,967						
Easton	340	1,424	332	1,317	....	84,077	97,620	1,319	183,016
Easton tp	1,084		985		1,250,689	....	193,770	330,816	1,775,275
Basehor	200	1,026	212	1,015	1,411,159	59,459	264,030	718,778	2,453,426
Fairmount	79		67						
Fairmount tp	747		736						
High Prairie tp		1,152		1,190	1,508,057	3,970	169,140	263,403	1,944,570
Kickapoo tp		1,381		1,162	1,318,766	98,384	168,870	1,455,213	3,041,233
Reno tp		829		838	1,370,626	8,935	159,310	930,346	2,469,217
Lenape	69	1,324	64	1,299	....	....	....	....	....
Linwood	344		346		....	89,555	55,810	12,799	158,164
Sherman tp	911		889		1,440,290	....	122,480	943,924	2,506,694
Stranger tp		977		975	1,516,362	....	185,110	537,051	2,238,523
Tonganoxie	1,030	2,180	987	2,070	....	408,485	247,890	31,924	688,299
Tonganoxie tp	1,150		1,083		1,557,665	23,350	175,280	469,497	2,225,792
Leavenworth:									
1st ward	3,001	22,110	3,068	22,353	....	10,512,155	5,569,200	1,315,926	17,397,281
2d ward	3,267		3,329						
3d ward	3,351		3,395						
4th ward	2,740		2,803						
5th ward	3,610		3,434						
6th ward	6,141		6,324						

SUMMARY.—LEAVENWORTH COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops ... acres	215,227	$1,676,733.06	209,278	$2,313,497.24
Animals slaughtered and sold for slaughter	....	684,749.00	....	497,256.00
Poultry and eggs sold	....	95,024.00	....	81,740.00
Wool clip ... lbs.	7,312	1,243.04	7,941	1,588.20
Cheese ... lbs.	....	....	....	....
Butter ... lbs.	193,997	46,559.28	193,948	49,087.00
Milk sold	....	187,921.00	....	139,862.00
Honey and beeswax ... lbs.	13,010	1,970.30	1,682	282.30
Wood marketed	....	727.00	....	1,152.00
Totals	....	$2,644,926.68	....	$3,084,464.74

LIVE STOCK.—LEAVENWORTH COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	8,317	$939,821.00	7,574	$855,862.00	178	243
Mules and asses	2,380	311,780.00	2,492	326,452.00	19	16
Milch cows	9,361	374,440.00	8,838	397,710.00	149	99
Other cattle	9,643	260,361.00	7,117	227,744.00	184	113
Sheep	2,262	9,500.40	1,312	5,576.00	58	27
Swine	20,233	202,330.00	14,824	148,240.00	772	4,196
Totals	52,196	$2,098,232.40	42,157	$1,961,584.00	1,355	4,694

Number of dogs in county March 1, 1911, 2057; March 1, 1912, 2187.
Number of sheep killed by dogs, year ending March 1, 1911, 4; March 1, 1912, 22.
Number of sheep killed by wolves, year ending March 1, 1911, 32; March 1, 1912, 75.

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LINCOLN COUNTY.

Organized in 1870; area, 720 square miles; population, 10,266; rank in population, 65; assessed valuation, $21,654,441; miles of railroad, main track, 38.57; county seat, Lincoln, population, 1507.

POPULATION AND VALUATION.—LINCOLN COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county		10,173		10,266	$14,427,690	$1,311,655	$4,637,885	$1,277,211	$21,654,441
Battle Creek tp.		339		372	$639,540	....	$129,490	$365	$769,395
Beaver tp.		417		303	543,670	....	81,775	148	625,593
Cedron tp.		412		396	601,615	....	129,645	1,060	732,320
Beverly	298	710	315	751	....	$101,520	182,725	3,945	288,190
Colorado tp.	412		436		998,435	5,125	243,690	181,196	1,428,446
Elkhorn tp.		515		508	1,113,120	....	203,220	185,861	1,502,201
Franklin tp.		398		397	660,150	....	169,790	74	830,014
Golden Belt tp.		245		252	621,800	....	83,165	962	705,927
Grant tp.		451		466	671,615	....	216,180	1,288	889,083
Hanover tp.		369		373	641,780	....	142,045	2,315	786,140
Highland tp.		308		304	571,700	....	82,115	386	654,201
Indiana tp.		399		384	893,525	....	156,825	180,765	1,231,115
Logan tp.		336		343	586,295	....	122,180	210	708,685
Madison tp.		362		357	600,200	....	132,770	....	732,970
Marion tp.		414		426	719,225	....	139,985	248	859,458
Orange tp.		341		380	652,470	2,800	142,150	2,402	799,822
Sylvan Grove	533	892	541	928	....	244,110	356,800	8,133	609,043
Pleasant tp.	359		387		914,260	....	179,455	204,610	1,298,325
Salt Creek tp.		420		425	793,690	1,375	171,010	257,752	1,223,827
Barnard	320	681	338	697	....	187,675	236,820	22,701	447,196
Scott tp.	361		359		724,550	....	204,650	25,720	954,920
Valley tp.		236		245	598,100	....	123,505	507	722,112
Vesper tp.		448		452	881,950	17,170	254,465	192,953	1,346,538
Lincoln*		1,480		1,507	....	751,880	753,430	3,610	1,508,920

*** In Elkhorn, Beaver, Marion and Indiana townships.**

FARM AND CROP STATISTICS.—LINCOLN COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	74,951	449,706	$382,250.10	111,272	2,114,168	$1,627,909.36
Spring wheat.......bu.	....	....	....	....	....	....
Corn...............bu.	66,723	600,507	384,324.48	55,911	1,397,775	782,754.00
Oats...............bu.	8,645	17,290	7,780.50	4,795	172,620	75,952.80
Rye................bu.	14	70	59.50	203	3,654	2,557.80
Barley.............bu.	42	210	115.50	26	650	292.50
Emmer ("speltz")..bu.	65	....	....	47	940	451.20
Buckwheat..........bu.	....	....	....	....	....	....
Irish potatoes.....bu.	674	8,088	8,249.76	484	39,688	32,147.28
Sweet potatoes.....bu.	....	....	....	....	....	....
Castor-beans.......bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn.........lbs.	1	200	12.00	1	500	20 00
Millet & hungarian, tons	139	209	1,463.00	99	173	865.00
Sugar-beets........tons	....	....	....	1	9	45.00
Sorghum for—						
syrup or sugar...gals.	1	50	25.00	4	260	122.20
forage or grain..tons	5,868	....	41,076.00	5,519	....	60,709.00
Milo maize.........tons	244	488	3,172.00	8	28	116.00
Kafir-corn.........tons	12,307	30,768	184,608.00	12,852	51,408	205,632.00

FARM AND CROP STATISTICS.—LINCOLN COUNTY.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Jerusalem corn....tons	....	....	....	....	....	....
Timothy.........tons	30	* 17,924	$197,164.00	....	† 9,871	$83,903.50
Clover............tons	....			....		
Blue-grass........tons	8			10,711		
Alfalfa...........tons	10,852					
Orchard-grass.....tons	....			....		
Other tame grasses, tons	5			....		
Prairie-grass fnc'd, tons	178,949	7,858	70,722.00	164,123	3,879	27,153.00
Totals..............	359,518	....	$1.281,021 84	366,056	....	$2,900,630.64

Corn on hand March 1, 1911, 472,658 bushels; March 1, 1912, 66,539 bushels.
Wheat on hand March 1, 1911, 164,875 bushels; March 1, 1912, 21,030 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—LINCOLN COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops.............................acres	359,518	$1,281,021.84	366,056	$2,900,630.64
Animals slaughtered and sold for slaughter....	....	899,566.00	....	849,914.00
Poultry and eggs sold........................	....	165,357.00	....	127,949.00
Wool clip..............................lbs.	385	65.45	100	20.00
Cheese.................................lbs.	....	....	....	....
Butter.................................lbs.	212,425	50,982.00	199,951	49,987.75
Milk sold..................................	....	66,735.00	....	54,755.00
Honey and beeswax......................lbs.	1,601	241.75	1,270	190.70
Wood marketed..............................	....	80.00	....	50.00
Totals.....................................	....	$2,464,019 04	....	$3,983,497.09

LIVE STOCK.—LINCOLN COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses......................	10,660	$1,204,580.00	10,484	$1,184,692.00	192	208
Mules and asses.............	2,030	265,930.00	2,262	296,322.00	10	9
Milch cows..................	9,419	376,760.00	10,736	483,120.00	74	85
Other cattle................	32,909	888,543.00	28,052	897,664.00	485	460
Sheep.......................	474	1,990.80	909	3,863.25	1	....
Swine.......................	21,584	215,840.00	14,795	147,950.00	168	1,463
Totals......................	77,076	$2,953,643.80	67,238	$3,013,611.25	930	2,225

Number of dogs in county March 1, 1911, 1718; March 1, 1912, 1709.
Number of sheep killed by dogs, year ending March 1, 1911, 1.

LINN COUNTY.

Organized in 1855; area, 637 square miles; population, 15,874; rank in population, 39; assessed valuation, $19,659,085; miles of railroad, main track, 90.37; county seat, Mound City, population, 791.

POPULATION AND VALUATION.—LINN COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities.)	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county	15,678	15,874	$11,387,315	$1,490,205	$3,502,100	$3,279,465	$19,659,085
Blue Mound	576 } 1,458	580 } 1,440	$1,206,489	$131,985	$383,365	$448,104	$2,169,943
Blue Mound tp.	882	860					
Centerville tp.	1,639	1,634	1,504,573	31,040	359,060	436,178	2,330,851
Parker	395 } 1,547	401 } 1,612	1,325,895	127,635	353,865	399,770	2,207,165
Liberty tp.	1,152	1,211					
La Cygne	991 } 1,875	1,069 } 1,941	974,676	271,555	378,745	202,087	1,827,063
Lincoln tp.	884	872					
Mound City	761 } 1,614	791 } 1,674	935,964	296,205	355,950	215,293	1,803,412
Mound City tp.	853	883					
Paris tp.	1,127	1,130	1,121,238	....	201,285	38,050	1,360,573
Pleasanton	1,705 } 3,083	1,775 } 3,171	1,069,836	556,545	705,425	629,006	2,960,812
Potosi tp.	1,378	1,396					
Scott tp.	1,010	986	1,112,499	....	238,350	167,449	1,518,298
Prescott	221 } 1,060	236 } 1,054	919,163	63,780	299,470	421,788	1,704,201
Sheridan tp.	839	818					
Stanton tp.	574	536	599,398	....	118,675	100,483	818,556
Valley tp.	691	696	617,584	11,460	107,910	221,257	958,211

FARM AND CROP STATISTICS.—LINN COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	8,988	134,820	$114,597.00	17,771	337,649	$307,260.59
Spring wheat.......bu.	12	124	95.68	....	....	....
Corn...............bu.	73,762	1,106,430	641,729.40	66,694	1,533,962	812,999.86
Oats...............bu.	16,459	296,262	118,504.80	6,639	199,170	77,676.30
Rye................bu.	262	4,454	3,785.90	499	7,984	6,067.84
Barley.............bu.	39	585	321.75	8	184	82.80
Emmer ("speltz")..bu.	17	255	114.75	2	42	18.90
Buckwheat..........bu.	10	80	80.00	4	48	48.00
Irish potatoes.......bu.	580	9,860	9,367.00	388	19,400	14,550.00
Sweet potatoes......bu.	6	300	375.00	3	225	225.00
Castor-beans........bu.	....	....	....	30	300	300.00
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	9,362	37,448	63,661.60	6,658	46,606	69,909.00
Tobacco............lbs.	1	1,000	100.00	1	900	90.00
Broom-corn........lbs.	2	900	58.50	....	....	....
Millet & hungarian, tons	477	716	5,012.00	573	1,002	5,010.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	180	9,900	4,950.00	296	24,568	12,284.00
forage or grain..tons	667	....	6,003.00	1,487	....	14,870.00
Milo maize........tons	60	120	660.00	73	219	985.50
Kafir-corn........tons	4 881	14,643	73,215.00	9,623	33,680	134,720.00
Jerusalem corn....tons	38	114	570.00	4	14	56.00
Timothy..........tons	34,448	* 24,412	292,944.00	23,187	† 12,564	131,922.00
Clover...........tons	5,041			5,297		
Blue-grass........tons	2,953			3,938		
Alfalfa...........tons	570			884		
Orchard-grass.....tons	28			6		
Other tame grasses, tons	4,696			3,270		
Prairie-grass fnc'd, tons	112,434	10,406	93,654 00	100,837	7,496	59,968.00
Totals............	275,973	....	$1,429,799.38	248,172	....	$1,649,043.79

Corn on hand March 1, 1911, 298.480 bushels; March 1, 1912, 172,785 bushels.
Wheat on hand March 1, 1911, 2315 bushels; March 1, 1912, 2640 bushels.

*** Product of 1910.** **† Product of 1911.**

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SUMMARY.—LINN COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops .... acres	275,973	$1,429,799.88	248,172	$1,649,043.79
Animals slaughtered and sold for slaughter....	....	686,917.00	....	485,513.00
Poultry and eggs sold........	....	179,634.00	....	138,736.00
Wool clip........ lbs.	10,753	1,828.01	19,803	3,960.60
Cheese........ lbs.	20	2.60	....	....
Butter........ lbs.	270,963	65,031.12	254,379	63,594.75
Milk sold........	....	39,232 00	....	38,119.00
Honey and beeswax........ lbs.	7,606	1,156.10	8,588	1,332.80
Wood marketed........	....	535.00	....	1,269.00
Totals........	....	$2,404,135.21	....	$2,381,574.94

LIVE STOCK.—LINN COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses........	10,278	$1,161,414.00	10,159	$1,147,967.00	249	162
Mules and asses........	2,168	284,008.00	2,336	306,016.00	25	12
Milch cows........	7,604	304,160.00	8,517	383,265.00	110	85
Other cattle........	11,298	305,046.00	10,416	333,312.00	163	120
Sheep........	4,487	18,845.40	3,109	18,213.25	172	129
Swine........	21,762	217,620.00	20,782	207,820.00	1,736	2,149
Totals........	57,597	$2,291,093.40	55,319	$2,391,593.25	2,455	2,657

Number of dogs in county March 1, 1911, 2178; March 1, 1912, 2100.
Number of sheep killed by dogs, year ending March 1, 1911, 68; March 1, 1912, 16.
Number of sheep killed by wolves, year ending March 1, 1912, 44.

LOGAN COUNTY.

Organized in 1888; area, 1080 square miles; population, 3537; rank in population, 91; assessed valuation, $7,643,815; miles of railroad, main track, 75.77; county seat, Russell Springs, population, 109.

POPULATION AND VALUATION.—LOGAN COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county........	4,010	3,537	$3,951,804	$392,692	$1,121,905	$2,177,414	$7,643,815
Augustine tp........	188	183	$187,982	....	$33,070	$63	$221,115
Elkader tp........	389	274	337,061	....	40,465	16,808	394,334
Lees tp........	215	155	143,717	$980	17,055	63,255	224,957
Logansport tp....	262	189	302,998	940	37,645	163,301	444,884
McAllaster tp.....	215	226	288,794	5,169	74,770	440,138	808,871
Monument tp.....	389	312	641,437	28,874	157,705	445,499	1,273,515
Oakley........	676 } 1,150	595 } 1,014	....	263,929	252,000	139,598	655,527
Oakley tp........	474	419	699,525	....	81,620	356,615	1,137,760
Paxton tp........	147	139	169,850	....	33,260	....	203,110
Russell Springs...	91 } 390	109 } 407	....	38,922	103,670	8,549	151,141
Russell Springs tp.	299	298	282,912	....	60,185	38,774	381,871
Western tp........	261	247	308,406	....	85,345	24,264	418,015
Winona tp........	404	391	589,122	58,928	145,115	540,550	1,328,715

FARM AND CROP STATISTICS.—LOGAN COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	....	....	....	6,874	20,622	$16,291.38
Spring wheat.......bu.	1,547	....	....	640	1,920	1,396.11
Corn...............bu.	28,182	....	....	17,253	276,048	165,628.80
Oats...............bu.	3,205	....	....	3,916	50,908	20,872.28
Rye................bu.	227	....	....	321	3,210	2,279.10
Barley.............bu.	6,786	....	....	3,987	39,870	17,144.10
Emmer ("speltz")..bu.	4,208	....	....	1,743	20,916	10,458.00
Buckwheat..........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	196	....	....	121	8,228	7,076.08
Sweet potatoes......bu.	....	....	....	1	50	50.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	195	19,500	$975.00	18	7,200	180.00
Millet & hungarian, tons	2,488	2,488	19,904.00	2,227	3,340	16,700.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	30	600	300.00	2	110	55.00
forage or grain..tons	44,655	....	223,275.00	32,497	....	292,473.00
Milo maize........tons	4,346	2,173	17,384.00	4,222	8,444	46,442.00
Kafir-corn........tons	7,120	3,560	28,480.00	6,763	20,289	91,300.50
Jerusalem corn....tons	63	37	296.00	50	150	675.00
Timothy..........tons	....			....		
Clover............tons	....			....		
Blue-grass........tons	....			....		
Alfalfa...........tons	3,979	* 3,516	45,708.00	3,002	† 2,345	18,760.00
Orchard-grass.....tons	....			....		
Other tame grasses, tons	....			....		
Prairie-grass fnc'd, tons	165,959	750	7,500.00	207,981	669	4,348.50
Totals.............	273,186	....	$343,822.00	291,618	....	$712,129.85

Corn on hand March 1, 1911, 31,780 bushels; March 1, 1912, 905 bushels.
Wheat on hand March 1, 1911, 3655 bushels; March 1, 1912, 260 bushels.

*** Product of 1910. † Product of 1911.**

SUMMARY.—LOGAN COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops.......................acres	273,186	$343,822.00	291,618	$712,129.85
Animals slaughtered and sold for slaughter....	....	67,400.00	....	45,692.00
Poultry and eggs sold..................	....	20,379.00	....	11,681.00
Wool clip..........................lbs.	29,460	5,008.20	13,800	2,760.00
Cheese............................lbs.	....	....	....	....
Butter.............................lbs.	60,493	14,518.32	42,412	10,603.00
Milk sold..............................	....	24,492.00	....	22,186.00
Honey and beeswax...................lbs.	....	....	....	....
Wood marketed.........................	....	35.00	....	40.00
Totals.................................	....	$475,654.52	....	$805,091.85

LIVE STOCK.—LOGAN COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	5,912	$668,056.00	5,298	$598,674.00	69	93
Mules and asses	1,111	145,541.00	961	125,891.00	5	5
Milch cows	3,178	127,120.00	2,722	122,490.00	12	55
Other cattle	4,756	128,412.00	3,871	123,872.00	50	95
Sheep	3,256	13,675.20	2,620	11,135.00	50	....
Swine	2,280	22,800.00	1,394	13,940.00	17	14
Totals	20,493	$1,105,604.20	16,866	$996,002.00	203	262

Number of dogs in county March 1, 1911, 716; March 1, 1912, 622.
Number of sheep killed by dogs, year ending March 1, 1911, 40
Number of sheep killed by wolves, year ending March 1, 1912, 33.

LYON COUNTY.

Organized in 1858; area, 858 square miles; population, 27,548; rank in population, 13; assessed valuation, $39,789,289; miles of railroad, main track, 106.79; county seat, Emporia, population, 11,334.

FARM AND CROP STATISTICS.—LYON COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	5,214	130,350	$113,404.50	9,961	209,181	$175,712.04
Spring wheat.......bu.	....	....	....	4	80	67.20
Corn.......bu.	117,733	2,590,126	1,424,569.30	100,515	2,412,360	1,423,292.40
Oats.......bu.	16,715	317,585	120,682.30	6,063	169,764	67,905.60
Rye.......bu.	49	980	833.00	179	4,475	3,132.50
Barley.......bu.	....	....	....	10	280	120.40
Emmer ("speltz")..bu.	....	....	....	8	200	92.00
Buckwheat.......bu.	....	....	....	....	....	....
Irish potatoes.......bu.	1,424	25,632	25,632.00	1,140	78,660	58,208.40
Sweet potatoes.......bu.	54	2,592	3,214.08	39	3,705	3,334.50
Castor-beans.......bu.	....	....	....	1	10	10.00
Cotton.......lbs.	....	....	....	....	....	....
Flax.......bu.	3,262	9,786	17,614.80	976	5,856	8,784.00
Tobacco.......lbs.	....	....	....	....	....	....
Broom-corn.......lbs.	12	6,000	390.00	21	10,500	446.25
Millet & hungarian, tons	2,734	5,468	38,276.00	1,826	3,652	20,086.00
Sugar-beets.......tons	....	....	....	515	5,150	25,750.00
Sorghum for—						
syrup or sugar...gals.	761	57,075	28,537.50	496	42,160	18,972.00
forage or grain..tons	3,926	....	35,334.00	7,399	....	81,389.00
Milo maize.......tons	84	102	612.00	553	1,659	8,295.00
Kafir-corn.......tons	22,166	88,664	443,320.00	37,047	129,664	518,656.00
Jerusalem corn....tons	....	....	....	....	....	....
Timothy.......tons	2,474	* 24,756	222,804.00	1,379	† 22,619	214,880.50
Clover.......tons	5,652			3,520		
Blue-grass.......tons	2,019			2,069		
Alfalfa.......tons	12,828			16,280		
Orchard-grass.....tons	5			139		
Other tame grasses, tons	3,815			1,306		
Prairie-grass fnc'd, tons	196,312	34,820	243,740.00	174,213	26,247	183,729.00
Totals	397,189	....	$2,718,963.48	365,659	....	$2,812,862.79

Corn on hand March 1, 1911, 510,343 bushels; March 1, 1912, 296,435 bushels.
Wheat on hand March 1, 1911, 63,502 bushels; March 1, 1912, 4295 bushels.

* Product of 1910. † Product of 1911.

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POPULATION AND VALUATION.—LYON COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county		25,230		27,548	$17,913,848	$8,178,821	$7,396,225	$6,300,395	$39,789,289
Allen	*....	1,526	334	1,537	....	$92,635	$101,500	$26,800	$220,935
Agnes tp.	1,526		1,203		$1,680,247	35,464	322,110	578,150	2,615,971
Americus	524	1,927	428	1,854	....	154,008	110,000	30,844	294,852
Americus tp.	1,403		1,426		1,592,950	....	326,770	273,057	2,592,777
Olpe	*....	1,649	281	1,803	....	77,665	94,410	30,663	202,738
Center tp.	1,649		1,522		1,977,255	....	434,240	455,619	2,867,114
Hartford	533	2,273	609	2,238	....	241,725	194,430	24,424	460,579
Elmendaro	1,740		1,629		1,996,730	....	418,770	38,661	2,454,161
Emporia	9,050	11,396	11,234	13,711	....	7,150,580	3,102.320	659,463	10,912,363
Emporia tp.	2,346		2,377		2,436,478	190,735	456,020	1,390,941	4,474,174
Fremont tp.		1,210		1,142	1,532,135	....	236,160	168,216	1,936,511
Ivy tp.		636		601	664,998	73,888	283,620	347,815	1,370,321
Neosho Rapids	279	1,783	257	1,699	....	42,155	45,175	54,516	141,846
Jackson tp.	1,504		1,442		1,935,605	....	338,050	1,074,569	3,348,224
Pike tp.		934		1,020	1,208,624	12,853	306,720	512,245	2,040.442
Reading	279	999	323	1,066	....	96,023	102,740	61,435	260,198
Reading tp.	720		743		1,327,431	....	267,120	415,741	2,010,292
Waterloo tp.		897		877	1,161,395	11,090	256,070	157,236	1,585,791

*** Not reported separately from township in 1911.**

SUMMARY.—LYON COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops ... acres	397,189	$2,718,963.48	365,659	$2,812,862.79
Animals slaughtered and sold for slaughter	....	1,751,611.00	....	1,982,761.00
Poultry and eggs sold	....	212,901.00	....	200,187.00
Wool clip ... lbs.	1,533	260.61	7,767	1,553.40
Cheese ... lbs.	50	6.50	....	....
Butter ... lbs.	382,962	91,910.88	415,203	103,800.75
Milk sold	....	101,178.00	....	103,280.00
Honey and beeswax ... lbs.	11,575	1,754.55	4,333	660.95
Wood marketed	....	70.00	....	995.00
Totals	....	$4,878,656.02	....	$5,156,100.89

LIVE STOCK.—LYON COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	13,414	$1,515,782.00	13,472	$1,522,336.00	378	523
Mules and asses	2,636	345,316.00	3,017	395,227.00	29	27
Milch cows	12.049	481,960.00	13,692	616,140.00	154	227
Other cattle	36,520	986,040.00	30,288	969,216.00	388	365
Sheep	4,955	20,811.00	6,550	27,837.50	41	46
Swine	30,586	305,860.00	29,645	296,450.00	1,782	7,042
Totals	100.160	$3,655,769.00	96,664	$3,827,206.50	2,772	8,230

Number of dogs in county March 1, 1911, 3148; March 1, 1912 3043.
Number of sheep killed by dogs, year ending March 1, 1911, 3.
Number of sheep killed by wolves, year ending March 1, 1911, 11.

MARION COUNTY.

Organized in 1865; area, 954 square miles; population, 22,753; rank in population, 18; assessed valuation, $39,704,557; miles of railroad, main track, 129.43; county seat, Marion, population, 2052.

POPULATION AND VALUATION.—MARION COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county		22,700		22,753	$23,035,786	$2,884.862	$6,901,833	$6,882,576	$39,704,557
Tampa	254	630	291	696	....	$93,305	$107,087	$20,561	$220,953
Blaine tp	376		405		$874,544	....	97,452	124,463	1,096,459
Catlin tp		690		698	1,034,265	12,840	255,975	666,300	1,969,380
Marion	2,138	2,791	2,052	2,701	....	714,315	563,046	162,513	1,439,874
Center tp	653		649		1,228,210	....	290,095	202,694	1,720,999
Clark tp		572		599	1,037,347	....	146,407	1,481	1,185,235
Lincolnville	* ...	1,159	222	1,177	....	46,785	88,274	30,273	165,332
Clear Creek tp	1,159		955		1,653,213	....	326,869	396,130	2,376,212
Colfax tp		566		549	1,009,338	....	209,520	301,336	1,520,194
Florence	1,329	1,811	1,355	1,856	....	267,790	273,561	143,540	684,891
Doyle tp	482		501		654,052	....	94,373	633,941	1,382,366
Durham	289	807	316	840	....	106,850	94,192	31,578	232,620
Durham Park tp	518		524		974,959	....	162,509	212,200	1,349,668
East Branch tp		519		541	861,216	....	161,925	2,988	1,026,129
Fairplay tp		544		537	944,994	4,775	152,395	770,298	1,872,462
Gale tp		636		622	1,057,300	6,366	232,766	203,686	1,500,118
Grant tp		653		656	1,049,903	....	189,333	982	1,240,218
Lehigh	400	973	412	981	.....	121,150	86,418	26,452	234,020
Lehigh tp	573		569		835,372	....	104,680	410,555	1,350,607
Liberty tp		873		859	992,214	7.150	153,237	2,664	1,155,265
Ramona	273	827	277	813	....	77,875	77,529	24,707	180,111
Logan tp	554		536		669,606	....	95,834	115	765,555
Lost Springs	267	844	270	862	....	76,620	124,888	289,568	491,076
Lost Springs tp	577		592		907,605	....	180,881	296,552	1,384,538
Menno tp		796		808	980,893	....	146,597	....	1,127,490
Burns	432	661	424	641	....	213,185	215,666	44,604	473,455
Milton tp	229		217		511,329	....	79,284	334,560	925,173
Moore tp		298		318	665,754	....	98,982	153,066	917,802
Peabody	1,454	2,008	1,480	2,033	....	664,325	691,576	209,497	1,565,398
Peabody tp	554		553		1,114,278	....	294,657	607,551	2,016,486
Hillsboro	1,236	1,977	1,189	1,948	....	413,696	290,560	28,438	732,694
Risley tp	741		759		953,851	....	155,932	232,858	1,342,641
Summit tp		454		426	846,855	....	148,971	30,431	1,026,258
West Branch tp		850		854	1,011,632	12,900	254,251	448	1,279,237
Wilson tp		761		738	1,167,056	44,935	256,111	285,546	1,753,640

*** Not reported separately from township in 1911.**

FARM AND CROP STATISTICS.—MARION COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	67,749	1,083,984	$964,745.76	68,559	1,096,944	$899,494.08
Spring wheat.......bu.	1,412	14,190	11,093.40	....	....	....
Corn..............bu.	133,971	2,277,507	1,275,408.92	121,907	2,438,140	1,292,214.20
Oats..............bu.	57,584	1,094,096	404,815.52	46,580	1,304,240	469,526.40
Rye...............bu.	257	3,855	3,161.10	414	6,210	4,347.00
Barley............bu.	373	7,460	3,879.20	....	....	....
Emmer ("speltz")..bu.	25	450	207.00	5	150	69.00
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	848	20,352	23,608.32	751	52,570	39,963 20
Sweet potatoes.....bu.	3	114	137.94	....	....	....
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....

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FARM AND CROP STATISTICS.—MARION COUNTY.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Flax ....bu.	20	60	$108.00	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn ....lbs.	368	147,200	10,304.00	407	244,200	$9,157.50
Millet & hungarian, tons	3,159	6,318	41,067.00	2,927	5,854	29,270.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	86	6,880	3,440.00	140	10,500	4,725.00
forage or grain..tons	6,673	....	53,394.00	9,076	....	90,760.00
Milo maize........tons	13	39	254.00	79	197	886.50
Kafir-corn ....tons	13,246	52,984	317,904.00	22,884	68,652	274,608.00
Jerusalem corn....tons	....	....	....	133	399	1,596.00
Timothy..........tons	146	* 37,056	333,504.00	74	† 27,556	275,560.00
Clover............tons	52			50		
Blue-grass ....tons	747			382		
Alfalfa ....tons	20,186			19,947		
Orchard-grass.....tons	50			3		
Other tame grasses, tons	64			19		
Prairie-grass fnc'd, tons	144.085	21,580	151,060.00	153,812	20,013	160,104.00
Totals.............	451,117	....	$3,598,077.16	448,149	....	$3.552,270.88

Corn on hand March 1, 1911, 641,447 bushels; March 1, 1912, 356,785 bushels.
Wheat on hand March 1, 1911, 43,037 bushels; March 1, 1912, 50,281 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—MARION COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops ....acres	451,117	$3,598,077.16	448,149	$3,552,270.88
Animals slaughtered and sold for slaughter....	....	1,758,256.00	....	2,163,361.00
Poultry and eggs sold.......................	....	216,368.00	....	197,961.00
Wool clip...............................lbs.	3,641	618.97	1,682	336.40
Cheese...................................lbs.	20	2.60	24	3.36
Butter...................................lbs.	516,231	140,018.00	661,260	182,629.44
Milk sold.................................	....	121,305.00	....	117,343.00
Honey and beeswax......................lbs.	10,077	1,512.85	3,207	555.55
Wood marketed...........................	....	135.00	....	188.00
Totals..................................	....	$5,881,289.58	....	$6,214,648.63

LIVE STOCK.—MARION COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number	Value.	Number.	Value.	1911.	1912.
Horses	17,683	$1,998,179.00	18,308	$2,068,804.00	404	558
Mules and asses	1,789	234,359.00	1,726	226,106.00	6	14
Milch cows..................	14,132	565,280.00	14,963	673,335.00	236	274
Other cattle.................	34,201	923,427.00	28,674	917,568.00	1,014	1,014
Sheep	5,593	23,490.60	2,435	10,348.75	25	19
Swine........................	31,410	314,100.00	23,787	237,870.00	1,178	13,883
Totals......................	104,808	$4.058,835.60	89,893	$4,184,031.75	2.863	15,762

Number of dogs in county March 1, 1911, 3303; March 1, 1912, 3126.
Number of sheep killed by dogs, year ending March 1, 1911, 4; March 1, 1912, 4.
Number of sheep killed by wolves, year ending March 1, 1911, 10; March 1, 1912, 3.

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MARSHALL COUNTY.

Organized in 1855; area, 900 square miles; population, 22,461; rank in population, 19; assessed valuation, $46,782,765; miles of railroad, main track, 141.83; county seat, Marysville, population, 2048.

POPULATION AND VALUATION.—Marshall County.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......		22,959		22.461	$27,809,856	$4,451,350	$9,444,038	$5,077,526	$46,782,765
Balderson tp......		551		550	$1,489,584	....	$235,580	$420	$1,725,584
Bigelow tp........		615		617	927,838	$41,620	321,960	323,512	1,614,930
Irving............	386	931	365	880	....	132,260	154,210	60,151	346,621
Blue Rapids tp....	545		515		937,042	....	173,840	220,979	1,331,861
Blue Rapids......	1,741	2,162	1,714	2,145	....	651,620	323,860	70,739	1,046,219
BlueRapidsCity tp.	421		431		981,596	....	146,654	381,807	1,510,057
Center tp.........		569		571	1,075,625	12,050	205,446	291,677	1,584,798
Clear Fork tp.....		398		325	864,342	....	172,580	3,214	1,040,136
Cleveland tp......		532		512	894,495	26,320	159,230	256,508	1,336,553
Cottage Hill tp....		515		504	1,217,902	....	242,085	306	1,460,293
Elm Creek tp......		481		469	1,003,378	2,870	165,436	283,032	1,454,717
Franklin tp.......		718		785	1,474,278	65,970	390,955	187,782	2,118,985
Beattie...........	462	924	434	875	....	148,750	139,733	25,413	313,896
Guittard tp.......	462		441		1,160,657	....	150,475	231,216	1,542,348
Herkimer tp......		594		613	1,327,156	....	369,250	2,233	1,698,639
Lincoln tp........	*	....		567	979,222	....	197,130	102	1,176,454
Logan tp.........		710		709	1,312,840	52,100	369,269	216,178	1,950,384
Marysville........	2,290	2,953	2,048	2,704	....	1,319,660	1,052,937	77,378	2,449,975
Marysville tp......	663		656		1,328,933	4,750	316,002	430,269	2,079,954
Axtel............	714	1,546	717	1,278	....	324,080	460,375	51,216	835,671
Murray tp........	832		561		1,110,310	....	208,970	316,576	1,635,856
Vermillion........	330	1,263	312	812	....	114,210	153,760	25,193	293,163
Noble tp..........	933		500		973,968	30,880	201,670	208,087	1,414,605
Oketo............	225	762	234	800	....	81,960	110,100	111	192,171
Oketo tp..........	537		566		1,275,335	11,930	293,517	231,945	1,812,727
Richland tp.......		638		611	1,475,926	....	211,240	....	1,687,166
Rock tp..........		521		561	1,053,286	....	174,336	41,669	1,269,291
Summerfield......	526	1,075	513	1,059	....	242,190	222,270	30,207	494,667
St. Bridget tp.....	549		546		837,185	2,870	148,410	229,966	1,218,431
Frankfort.........	1,371	2,051	1,425	2,057	....	694,080	546,910	112,505	1,353,495
Vermillion tp.....	680		632		990,472	12,620	232,050	501,371	1,736,513
Walnut tp........		584		549	1,177,808	....	231,792	3,453	1,413,053
Waterville........	740	1,316	731	1,288	....	478,560	595,660	22,548	1,096,768
Waterville tp......	576		557		909,162	....	209,570	221,758	1,340,490
Wells tp..........		600		620	1,031,466	....	157,320	18,005	1,206,791

* New township formed from Murray and Noble townships.

FARM AND CROP STATISTICS.—Marshall County.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat........bu.	58,649	821,086	$689,712.24	23,363	350,445	$283,860.45
Spring wheat........bu.	725	7,250	5,800.00	642	7,704	5,778.00
Corn................bu.	179,995	2,517,930	1,385,961.50	209,099	3,763,782	2,082,442.28
Oats................bu.	47,957	335,695	134,279.60	48,116	1,395,364	488,377.40
Rye.................bu.	42	420	357.00	142	2,130	1,491.00
Barley..............bu.	....	....	....	....	....	....
Emmer ("speltz")....bu.	90	1,350	607.50	60	1,200	516.00
Buckwheat...........bu.	15	90	90.00	....	....	....
Irish potatoes.......bu.	1,517	42,476	46,723.60	1,368	101,850	71,296 00
Sweet potatoes......bu.	....	....	....	....	....	....
Castor-beans........bu.	....	....	....	....	....	....
Cotton..............lbs.	....	....	....	....	....	....
Flax................bu.	38	152	278.60	18	108	162.00

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FARM AND CROP STATISTICS.—MARSHALL COUNTY.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	2	800	$52.00	8	1,500	$60.00
Millet & hungarian, tons	12,877	19,316	135,212.00	15,687	31,374	172,557.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	24	2,040	1,020.00	73	4,380	2,190.00
forage or grain..tons	1,109	....	13,308.00	2,141	....	23,551.00
Milo maize........tons	5	10	70.00	6	18	90.00
Kafir-corn........tons	919	2,757	16,542.00	2,817	8,451	42,255.00
Jerusalem corn....tons	....	....	....	....	....	....
Timothy..........tons	5,821	* 30,598	367,176.00	4,678	† 12,771	127,710.00
Clover............tons	3,354			1,471		
Blue-grass.........tons	1,545			1,469		
Alfalfa...........tons	13,728			16,638		
Orchard-grass.....tons	160			87		
Other tame grasses, tons	752			649		
Prairie-grass fnc'd, tons	164,025	26,045	260,450.00	156,657	11,107	94,409.50
Totals.............	493,849	....	$3,057,635.04	485,174	....	$3,346,744.63

Corn on hand March 1, 1911, 1,769,760 bushels; March 1, 1912, 671,497 bushels.
Wheat on hand March 1, 1911, 39,025 bushels; March 1, 1912, 45,570 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—MARSHALL COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops..........................acres	498,349	$3,057,635.04	485,174	$3,346,744 63
Animals slaughtered and sold for slaughter....	....	1,231,832.00	....	1,204,115.00
Poultry and eggs sold....................	....	204,193.00	....	181,728.00
Wool clip..........................lbs.	1,434	243.78	1,299	259.80
Cheese.............................lbs.	2,728	354.64	3,296	461.44
Butter.............................lbs.	384,851	92,244.24	370,977	92,744 25
Milk sold............................	....	97,895.00	....	108,709.00
Honey and beeswax....................lbs.	32,238	4,854.00	985	155 45
Wood marketed........................	....	4,486.00	....	1,173.00
Totals................................	....	$4,693,737.70	....	$4,936,090.57

LIVE STOCK.—MARSHALL COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses......................	17,291	$1,953,883.00	17,150	$1,937,950.00	369	699
Mules and asses.............	3,490	457,190.00	3,272	428,632.00	31	34
Milch cows..................	13,414	536,560.00	14,573	655,785.00	165	253
Other cattle................	22,760	614,520.00	18,438	590,016.00	1,012	745
Sheep.......................	591	2,482.20	860	3,655.00	....	3
Swine.......................	43,818	438,180.00	42,668	426,680.00	772	2,019
Totals......................	101,364	$4,002,815.20	96,961	$4,042,718.00	2,349	3,753

Number of dogs in county March 1, 1911, 3380; March 1, 1912, 3249.
Number of sheep killed by dogs, year ending March 1, 1911, 2; March 1, 1912, 2.

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McPHERSON COUNTY.

Organized in 1870; area, 900 square miles; population, 21,037; rank in population, 22; assessed valuation, $43,981,582; miles of railroad, main track, 122.51; county seat, McPherson, population, 3457.

POPULATION AND VALUATION.—McPherson County.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county		20,975		21,037	$25,554,657	$4,616,017	$8,981,156	$4,829,752	$43,981,582
Battle Hill tp		368		359	$549,664	....	$112,230	....	$661,894
Bonnaville tp		204		219	376,672	....	84,120	$2,005	462,797
Canton	610	1,099	645	1,105	....	$250,847	230,147	66,021	547,015
Canton tp	489		460		1,170,359	....	180,650	488,034	1,839,043
Windom	165	535	177	528	....	67,685	128,450	25,766	221,901
Castle tp	370		351		849,464	....	113,705	224,766	1,187,935
Delmore tp		368		373	579,394	....	141,074	358	720,826
Galva	284	824	324	863	....	56,460	73,915	51,016	181,391
Empire tp	540		539		1,223,793	....	183,960	461,758	1,869,511
Groveland tp		517		542	1,233,378	4,010	194,383	222,283	1,654,054
Gypsum Creek tp		632		615	832,005	13,470	243,415	377	1,089,267
Harper tp		439		419	935,174	....	210,366	96	1,145,636
Hayes tp		529		524	1,237,346	....	266,260	366	1,503,972
Jackson tp		439		427	1,148,971	12,100	193,855	251,322	1,606,248
King City tp		483		443	1,215,055	5,390	190,050	322,225	1,732,720
Little Valley tp		500		525	1,044,050	....	175,275	47,563	1,266,888
Lone Tree tp		628		619	1,264,466	....	210,695	6,297	1,481,458
Marquette	710	1,203	724	1,209	....	346,130	301,380	55,323	702,833
Marquette tp	493		485		918,238	....	198,450	275,539	1,392,227
McPherson	3,439	3,979	3,457	4,018	....	2,200,630	1,725,786	234,906	4,161,322
McPherson tp	540		561		1,199,022	9,020	259,110	551,713	2,018,865
Meridian tp		616		664	1,324,698	....	175,220	5,581	1,505,499
Mound Ridge	609	1,251	639	1,272	....	267,710	264,770	19,664	552,144
Mound tp	642		633		1,295,042	....	231,279	223,483	1,749,804
New Gottland tp		468		468	853,448	....	190,848	177,907	1,222,203
Lindsborg	2,274	2,832	2,198	2,758	....	1,193,920	1,134,435	106,705	2,435,060
Smoky Hill tp	558		560		1,110,770	....	322,281	359,293	1,792,344
S.Sharp'sCreek tp		359		363	620,837	....	117,855	6,138	744,830
Spring Valley tp		623		647	1,256,414	....	276,958	....	1,533,372
Inman	448	1,103	478	1,135	....	188,645	181,790	32,359	402,794
Superior tp	655		657		1,265,636	....	239,115	234,148	1,738,894
Turkey Creek tp		517		528	1,254,727	....	181,969	569	1,437,265
Union tp		459		474	796,034	....	247,360	376,176	1,419,570

FARM AND CROP STATISTICS.—McPherson County.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	**123,458**	**1,728,412**	**$1,486,434.32**	**76,239**	**914,868**	**$731,894.40**
Spring wheat.......bu.	**219**	**2,230**	**1,686.90**	**499**	**5,002**	**3,758.10**
Corn...............bu.	**122,417**	**1,713,838**	**1,028,302.80**	**142,287**	**2,845,740**	**1,479,784.80**
Oats...............bu.	**47,879**	**622,427**	**242,746.53**	**68,161**	**1,908,508**	**706,147.96**
Rye................bu.	**950**	**10,450**	**8,360.00**	**1,181**	**15,353**	**10,900.63**
Barley.............bu.	**2,809**	**36,517**	**19,354.01**	**1,339**	**33,475**	**13,390.00**
Emmer ("speltz")..bu.	**30**	**450**	**202.50**	....	....	....
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	**898**	**12,572**	**14,080.64**	**783**	**49,329**	**89,463.20**
Sweet potatoes......bu.	**2**	**98**	**117.60**	**2**	**168**	**157.92**
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....

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FARM AND CROP STATISTICS.—McPHERSON COUNTY.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	1,232	554,400	$38,808 00	1,551	849,948	$33,997.92
Millet & hungarian, tons	2,866	4,299	30,093.00	1,794	4,036	22,198.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	112	7,280	3,640.00	173	13,840	6,920 00
forage or grain..tons	4,010	....	36,090.00	5,588	....	61,468.00
Milo maize........tons	17	43	301.00	21	63	283.50
Kafir-corn........tons	6,586	19,758	118,548.00	15,362	53,767	215,068.00
Jerusalem corn....tons	....	....	....	....	....	....
Timothy..........tons	30	* 25,178	251,780.00	....	† 16,979	169,790.00
Clover............tons	....			....		
Blue-grass........tons	159			52		
Alfalfa...........tons	18,328			19,161		
Orchard-grass.....tons	....			30		
Other tame grasses, tons	1,235			1,134		
Prairie-grass fnc'd, tons	128,539	20,086	180,774.00	133,193	11,073	88,584.00
Totals.............	461,776	....	$3.461,319 30	468,550	....	$3,583,806.43

Corn on hand March 1, 1911, 847.833 bushels; March 1, 1912, 281,595 bushels.
Wheat on hand March 1, 1911, 141,081 bushels; March 1, 1912, 135,402 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—McPHERSON COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops.............................acres	461,776	$3,461,319.30	468,550	$3,583,806.43
Animals slaughtered and sold for slaughter....	....	1,400,738.00	....	1,170,473.00
Poultry and eggs sold..........................	....	219,935.00	....	193,393.00
Wool clip.................................lbs.	2,549	433.33	10,148	2,029.60
Cheese....................................lbs.	1,000	130.00	1,080	151.20
Butter....................................lbs.	319,827	76,758.48	286,940	71,735.00
Milk sold......................................	....	120,055.00	....	109,412.00
Honey and beeswax.........................lbs.	23,817	3,587.35	1,815	276.25
Wood marketed..................................	....	146 00	....	260.00
Totals...	....	$5,283,102.46	....	$5,131,536.48

LIVE STOCK.—McPHERSON COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses......................	17,381	$1.964,053.00	16,905	$1,910,265.00	303	420
Mules and asses.............	2,843	306,933.00	2,433	318,723.00	19	6
Milch cows..................	11,495	459,800.00	13,115	590,175.00	144	107
Other cattle................	30,903	834,381.00	26,394	844,608.00	598	403
Sheep.......................	8.320	34,944.00	738	3,136.50	371	234
Swine.......................	44.700	447,000.00	31,903	319,030.00	1,007	5,309
Totals......................	115,142	$4.047,111.00	91,488	$3.985,937.50	2,442	6,479

Number of dogs in county March 1, 1911, 2.911; March 1, 1912. 2,652.
Number of sheep killed by dogs, year ending March 1, 1911, 25.
Number of sheep killed by wolves, year ending March 1, 1911, 8; March 1, 1912, 9.

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MEADE COUNTY.

Organized in 1885; area, 975 square miles; population, 5,196; rank in population, 81; assessed valuation, $9,532,206; miles of railroad, main track, 33.47; county seat, Meade, population, 745.

POPULATION AND VALUATION.—MEADE COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......	5,171	5,196	$5,598,349	$518,352	$1,911,116	$1,504,389	$9,532,206
Cimarron tp......	422	345	$367,365	....	$167,498	$341	$535,204
Crooked Creek tp..	265	279	552,545	....	126,406	935	679,886
Fowler...........	484 } 1,009	510 } 1,120	....	$170,100	212,082	26,406	408,588
Fowler tp.........	525	610	1,196,814	....	179,928	450,470	1,827,212
Logan tp.........	462	496	488,490	....	139,160	1,675	629,325
Meade...........	752 } 1,173	745 } 1,166	....	244,133	387,611	51,540	683,284
Meade Center.....	421	421	833,265	....	196,413	287,636	1,317,314
Mertilla tp........	257	274	781,495	912	82,850	276,920	1,142,177
Odee tp...........	440	434	306,415	....	98,782	478	405,675
Sand Creek tp.....	444	447	344,890	....	84,293	160	429,343
Plains City.......	259 } 699	233 } 635	....	103,207	152,297	43,213	298,717
West Plains tp....	440	402	727,070	....	83,796	364,615	1,175,481

FARM AND CROP STATISTICS.—MEADE COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product	Value.
Winter wheat.......bu.	29,857	119,428	$101,513.80	103,889	1,246,668	$972,401.04
Spring wheat.......bu.	694	1,388	1,013.24	160	1,600	1,120.00
Corn...............bu.	18,040	234,520	133,676.40	5,936	136,528	79,186.24
Oats...............bu.	9,154	119,002	51,170.86	3,095	86,660	33,797.40
Rye................bu.	365	3,285	2,693.70	58	580	406.00
Barley.............bu.	12,145	133,595	65,461.55	7,008	154,176	69,379.20
Emmer ("speltz")..bu.	1,332	7,992	3,996.00	312	6,552	3,144.96
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	111	3,774	4,717.50	93	9,207	8,286.30
Sweet potatoes......bu.	8	504	630.00	4	340	340.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	604	232,540	13,952.40	1,243	497,200	14,916.00
Millet & hungarian, tons	1,092	1,638	11,466.00	1,352	2,366	11,830.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	66	3,960	1,980.00	799	59,925	29,962.50
forage or grain..tons	11,500	....	92,000.00	9,643	....	106,073.00
Milo maize........tons	11,057	27,643	165,858.00	8,347	16,694	100,164.00
Kafir-corn........tons	17,992	53,976	269,880.00	18,865	56,595	282,975.00
Jerusalem corn....tons	93	279	1,395.00	20	60	300.00
Timothy..........tons	....	* 11,146	111,460.00	....	† 12,836	128,360.00
Clover............tons	....			....		
Blue-grass........tons	3			....		
Alfalfa...........tons	11,863			9,486		
Orchard-grass.....tons	5			60		
Other tame grasses, tons	8			3		
Prairie-grass fnc'd, tons	146,603	3,261	26,088.00	163,227	2,541	17.787.00
Totals............	272,592	....	$1.058,952.45	333,600	....	$1,860,428.64

Corn on hand March 1, 1911, 8854 bushels; March 1, 1911, 8397 bushels.
Wheat on hand March 1, 1911, 52.219 bushels; March 1, 1912, 4796 bushels.

*** Product of 1910. † Product of 1911.**

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SUMMARY.—Meade County.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops.....acres	272,592	$1,058,952.45	333,600	$1,860,428.64
Animals slaughtered and sold for slaughter	....	170,330.00	....	205,960.00
Poultry and eggs sold	....	26,667.00	....	24,103.00
Wool clip.....lbs.	2,748	467.16	500	100.00
Cheese.....lbs.	220	28.60	....	....
Butter.....lbs.	108,414	26,019.36	86,586	21,646.50
Milk sold	....	6,303.00	....	11,251.00
Honey and beeswax.....lbs.	120	18.00	220	83.00
Wood marketed	....	....	....	....
Totals	....	$1,288,785.57	....	$2,123,522.14

LIVE STOCK.—Meade County.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.*

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	6,050	$683,650.00	6,390	$722,070.00	264	400
Mules and asses	1,015	132,965.00	1,113	145,803.00	10	28
Milch cows	4,883	195,320.00	6,964	313,380.00	79	167
Other cattle	9,089	244,058.00	9,872	315,904.00	384	770
Sheep	748	3,141.60	702	2,983.50	52	15
Swine	3,803	38,030.00	3,517	35,170.00	131	262
Totals	25,538	$1,297,159.60	28,558	$1,535,310.50	920	1,642

Number of dogs in county March 1, 1911, 848; March 1, 1912, 809.
Number of sheep killed by dogs, year ending March 1, 1912, 1.

MIAMI COUNTY.

Organized in 1855; area, 588 square miles; population, 18,628; rank in population, 33; assessed valuation, $29,389,522; miles of railroad, main track, 97.58; county seat, Paola, population, 3207.

POPULATION AND VALUATION.—Miami County.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county	18,951	18,628	$15,769,595	$2,961,885	$5,412,363	$5,245,679	$29,389,522
Marysville tp.	1,342	1,338	$1,733,330	$32,765	$864,264	$843,416	$2,973,775
Miami tp.	783	813	995,025	5,660	284,476	823	1,285,984
Middle Creek tp.	1,163	1,150	1,292,150	16,865	241,192	126,786	1,676,993
Mound tp.	724	762	712,890	18,500	173,559	223,105	1,128,054
Osage tp.	947	964	849,670	46,915	268,270	372,335	1,537,190

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POPULATION AND VALUATION.—MIAMI COUNTY.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
Osawatomie......	3,128	3,994	2,802	3,652	....	859,090	375,753	218,695	1,453,538
Osawatomie tp....	866		850		787,600	....	168,158	890,850	1,796,608
Paola............	3,165	3,858	3,207	3,885	....	1,742,530	1,372,485	297,108	3,412,118
Paola tp..........	693		678		1,152,900	....	207,782	703,002	2,063,684
Richland tp.......		1,200		1,190	2,027,220	....	330,798	162,728	2,520,746
Stanton tp........		733		721	999,440	3,075	258,746	9,356	1,270,617
Sugar Creek tp....		692		704	979,990	....	187,630	617	1,168,237
Ten Mile tp.......		1,017		1,001	1,664,815	49,070	341,104	660,425	2,715,414
Valley tp.........		879		901	1,032,610	....	292,976	543,073	1,868,659
Louisburg........	642	1,619	642	1,547	....	187,415	292,885	17,704	497,504
Wea tp...........	977		905		1,591,955	....	252,785	175,661	2,020,401

FARM AND CROP STATISTICS.—MIAMI COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	30,918	494,688	$430,378.56	49,121	884,178	$813,443.76
Spring wheat.......bu.	624	8,688	7,022.88	7	105	96.60
Corn...............bu.	72,423	1,086,345	695,260.80	75,748	1,817,852	963,461.56
Oats...............bu.	25,495	254,950	101,980.00	14,399	561,561	207,777.57
Rye................bu.	127	1,524	1,295.40	209	3,344	2,508.00
Barley.............bu.	49	882	485.10	28	700	315.00
Emmer ("speltz")..bu.	41	492	221.40	....	....	....
Buckwheat..........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	554	11,634	11,168.64	526	52,600	34,190.00
Sweet potatoes......bu.	11	693	866.25	14	1,400	1,260.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	5,530	22,120	39,816.00	2,332	16,324	24,486.00
Tobacco............lbs.	4	4,000	400.00	17	17,000	1,700.00
Broom-corn.........lbs.	16	7,200	468.00	5	3,000	135.00
Millet & hungarian, tons	303	606	4,242.00	618	927	5,098.50
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	69	4,140	2,070.00	94	7,520	3,760.00
forage or grain..tons	553	....	6,636.00	1,022	....	13,286.00
Milo maize........tons	22	55	358.00	32	112	560.00
Kafir-corn........tons	963	2,889	17,334.00	5,355	21,420	96,390.00
Jerusalem corn....tons	6	18	108.00	11	44	198.00
Timothy...........tons	31,927	* 26,883	322,596.00	23,592	† 6,601	66,010.00
Clover............tons	12,732			5,635		
Blue-grass........tons	9,517			10,344		
Alfalfa...........tons	974			1,472		
Orchard-grass.....tons	358			30		
Other tame grasses, tons	4,834			4,615		
Prairie-grass fnc'd, tons	95,929	8,035	72,315.00	95,618	3,900	31,200.00
Totals.............	293,979	....	$1,715,022.03	290,844	....	$2,265,875.99

Corn on hand March 1, 1911, 515,885 bushels; March 1, 1912, 206,561 bushels.
Wheat on hand March 1, 1911, 24,183 bushels; March 1, 1912, 20,213 bushels.

*** Product of 1910. † Product of 1911.**

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SUMMARY.—MIAMI COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops..........acres	293,979	$1,715,022.03	290,844	$2,265,875.99
Animals slaughtered and sold for slaughter....	....	1,184,212.00	........,..	837,186.00
Poultry and eggs sold..........	....	198,405.00	....	174,591.00
Wool clip..........lbs.	12,079	2,053.43	13,428	2,685 60
Cheese..........lbs.	......	....	... .	....
Butter..........lbs.	391,631	96,415.02	373,678	95,078.34
Milk sold..........	....	42,813.00	....	47,952.00
Honey and beeswax..........lbs.	6,540	994.90	4,644	708.70
Wood marketed..........	... .	2,325 00	....	1,556.00
Totals..........	....	$3,242,240 38	....	$3,425,633.63

LIVE STOCK.—MIAMI COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses..........	11,634	$1,314,642.00	11,649	$1,316,337.00	222	249
Mules and asses..........	2,444	320,164.00	2,740	358,940.00	20	21
Milch cows..........	8,245	329,800.00	9,329	419,805.00	115	109
Other cattle..........	11,246	303,642.00	11,063	354,016.00	196	155
Sheep..........	5,981	25,120.20	4,072	17,306.00	86	89
Swine..........	36,929	369 290.00	32,677	326,770.00	4,198	4,149
Totals..........	76,479	$2,662,658.20	71,530	$2,793,174.00	4,837	4,772

Number of dogs in county March 1, 1911, 2286; March 1, 1912, 2092.
Number of sheep killed by dogs, year ending March 1, 1911, 57; March 1, 1912, 90.
Number of sheep killed by wolves, year ending March 1, 1911, 165; March 1, 1912, 14.

MITCHELL COUNTY.

Organized in 1870; area, 720 square miles; population, 13,690; rank in population, 48; assessed valuation, $27,684,999; miles of railroad, main track, 45.49; county seat, Beloit, population, 2784.

POPULATION AND VALUATION.—MITCHELL COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......	14,033	13,690	$17,709,766	$2,513,545	$5,749,780	$1,711,908	$27,684,999
Asherville tp......	618	613	$1,023,100	$20,015	$298,715	$182,464	$1,524,294
Beloit..........	3,099 } 3,984	2,784 } 3.732	....	1,626,325	1,242,645	144,261	3,013,231
Beloit tp..........	885	948	1,390,218	....	267,965	306,787	1,964,970
Bloomfield tp......	498	475	935,463	....	189,800	3,255	1,128,518
Blue Hill tp.......	335	361	514,875	....	121,685	2,217	638,727

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POPULATION AND VALUATION.—MITCHELL COUNTY.

Townships. (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal	Railroad, etc.	Total.
Carr Creek tp.	423	349	$993,783	....	$147,265	$2,442	$1,143,490
Cawker	756 } 1,223	785 } 1,217	....	$343,440	339,960	39,854	723,254
Cawker tp.	467	432	1,239,699	....	188,665	201,562	1,629,926
Center tp.	385	472	807,372	....	129,645	2,020	939,037
Custer tp.	375	258	570,460	....	114,035	1,894	686,389
Eureka tp.	292	447	607,805	....	236,340	1,043	845,188
Glen Elder	690 } 1,228	606 } 1,080	....	318,340	459,980	21,669	799,989
Glen Elder tp.	538	474	1,196,054	....	170,925	202,768	1,569,747
Hayes tp.	477	574	698,516	....	109,640	3,625	811,781
Logan tp.	616	631	841,943	78,910	273,520	44,178	1,238,551
Lulu tp.	570	471	923,476	66,420	251,645	301,039	1,542,580
Pittsburg tp.	560	226	699,499	60,095	229,360	5,117	994,071
Plum Creek tp.	444	558	1,054,238	....	145,025	12,905	1,212,168
Round Springs tp.	218	314	492,912	....	77,060	960	570,932
Salt Creek tp.	321	457	620,861	....	182,355	1,809	805,025
Solomon Rapids tp	451	549	1,022,354	....	156,475	74,717	1,253,546
Turkey Creek tp.	504	368	1,059,909	....	262,310	151,933	1,474,152
Walnut Creek tp.	511	538	1,017,229	....	154,815	3,389	1,175,433

FARM AND CROP STATISTICS.—MITCHELL COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	85,458	683,664	$581,114.40	127,143	2,161,431	$1,685,916.18
Spring wheat.......bu.	....	....	....	....	....	....
Corn...............bu.	115,729	810,103	469,859.74	98,421	3,051,051	1,617,057.03
Oats...............bu.	13,886	124,974	49,989.60	6,562	236,232	99,217.44
Rye................bu.	56	224	185.92	84	1,512	1,073.52
Barley.............bu.	40	400	208.00	10	250	112.50
Emmer ("speltz")..bu.	10	100	48.00	15	330	158.40
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	1,223	13,453	13,587.53	671	48,312	37,683.36
Sweet potatoes......bu.	....	....	....	....	....	....
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	....	....	....	50	25,000	1,000.00
Millet & hungarian, tons	759	759	5,313.00	527	1,054	5,270.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	175	8,750	4,375.00	199	12,935	6,467.50
forage or grain..tons	3,788	....	26,519.00	4,135	....	45,485.00
Milo maize........tons	....	....	....	63	220	990.00
Kafir-corn........tons	5,506	16,518	99,108.00	4,849	19,396	77,584.00
Jerusalem corn....tons	....	....	....	....	....	....
Timothy..........tons	....	* 35,677	392,447.00	....	† 16,551	132,408.00
Clover............tons	....			....		
Blue-grass........tons	33			10		
Alfalfa...........tons	23,555			21,527		
Orchard-grass.....tons	....			....		
Other tame grasses, tons	....			....		
Prairie-grass fnc'd, tons	102,086	5,371	53,710.00	106,230	1,692	11,844.00
Totals............	352,304	....	$1,696,462.19	370,496	....	$3,722,266.93

Corn on hand March 1, 1911, 872,646 bushels; March 1, 1912, 128,628 bushels.
Wheat on hand March 1, 1911, 221,556 bushels; March 1, 1912, 64,209 bushels.
*** Product of 1910. † Product of 1911.**

SUMMARY.—MITCHELL COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops .... acres	352,304	$1,696,462 19	370,496	$3,722,266.93
Animals slaughtered and sold for slaughter....	....	1,217,016.00	....	1,029,115.00
Poultry and eggs sold......................	....	197,711.00	....	161,446.00
Wool clip .... lbs.	5,000	850.00	8,750	1,750.00
Cheese........................... lbs.	5	.65	....	....
Butter........................... lbs.	283,510	68,042.40	247,390	61,847.50
Milk sold................................	....	35,992.00	....	33,604.00
Honey and beeswax.................... lbs.	16,881	2,542.15	3,840	576.00
Wood marketed............................	....	1,290.00	....	162.00
Totals..............................	....	$3,219,906.39	....	$5,010,767.43

LIVE STOCK.—MITCHELL COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses......................	13,874	$1,567,762.00	13,476	$1,522,788.00	170	245
Mules and asses	2,813	368,503.00	2,864	375,184.00	23	11
Milch cows..................	8,508	340,820.00	9,813	441,585.00	89	100
Other cattle................	21,606	583,862.00	21,945	702,240.00	395	308
Sheep	19,534	82,042.80	9,162	38,938.50	43	10
Swine.......................	38,217	382,170.00	23,116	231,160.00	956	5,586
Totals.................	104,552	$3,324,159.80	80,376	$3,311,895.50	1,676	6,260

Number of dogs in county March 1, 1911, 2092; March 1, 1912, 1780.
Number of sheep killed by dogs, year ending March 1, 1911, 88; March 1, 1912, 15.

MONTGOMERY COUNTY.

Organized in 1869; area, 648 square miles; population, 50,748; rank in population, 4; assessed valuation, $59,435,462; miles of railroad, main track, 160.55; county seat, Independence, population, 9630.

POPULATION AND VALUATION.—MONTGOMERY COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......		54,231		50,748	$14,531,911	$15,812,886	$11,140,369	$17,950,296	$59,435,462
Caney............	5,061	6,797	3,119	4,895	....	$995,815	$499,260	$54,817	$1,549,892
Havana...........	212		230		....	58,290	62,825	91,907	213,022
Caney tp.........	1,524		1,546		$1,189,195	69,098	524,240	6,643,678	8,426,211
Cherokee tp.......		975		1,022	884,985	54,390	184,295	516,337	1,640,007
Cherryvale........	5,572	6,731	4,848	5,967	....	1,597,210	598,849	194,968	2,391,027
Cherry tp.........	1,159		1,119		1,179,152	23,400	528,800	1,113,081	2,844,433
Drum Creek tp....		942		886	813,780	16,565	187,710	505,830	1,523,885

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POPULATION AND VALUATION.—MONTGOMERY COUNTY.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
Dearing..........	219	2,262	237	2,204	....	$50,450	$48,540	$19,409	$118,399
Fawn Creek tp....	2,043		1,967		$1,845,587	47,775	526,290	1,529,526	3,449,178
Independence.....	10,651	12,620	9,630	11,483	....	5,768,565	2,427,710	572,208	8,768,483
Independence tp..	1,969		1,853		2,572,950	118,170	894,890	2,695,064	6,281,074
Liberty..........	250	1,025	272	972	....	60,550	81,160	8,733	150,443
Liberty tp.......	775		700		711,205	4,580	167,820	317,188	1,200,798
Elk..............	477	1,758	700	1,952	....	193,103	175,735	15,723	384,561
Louisburg tp.....	1,281		1,252		1,025,247	3,070	180,745	690,863	1,899,925
Coffeyville......	15,350	17,048	15,675	17,302	....	6,363,650	2,750,865	638,052	9,752,567
Parker tp........	1,698		1,627		1,497,780	197,950	511,270	501,895	2,708,895
Rutland tp.......		989		952	924,345	....	207,600	251,846	1,383,291
Sycamore tp......		1,983		2,004	1,892,655	36,590	347,240	1,017,001	3,293,486
West Cherry tp...		593		618	495,030	....	158,175	547,480	1,200,685
Tyro*............		508		491	....	153,665	76,350	25,190	255,205

* In Caney and Fawn Creek townships.

FARM AND CROP STATISTICS.—MONTGOMERY COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	24,290	388,640	$388,116.80	17,079	222,027	$182,062.14
Spring wheat.......bu.	....	....	....	....	....	....
Corn...............bu.	51,701	775,515	465,309.00	50,198	803,168	449,774.08
Oats...............bu.	33,728	539,648	210,462.72	22,207	755,038	286,914.44
Rye................bu.	98	1,274	1,057.42	167	2,505	1,878.75
Barley.............bu.	2	36	19.80	....	....	....
Emmer ("speltz")..bu.	46	828	372.60	1	20	9.00
Buckwheat..........bu.	....	....	....	....	....	....
Irish potatoes.....bu.	519	11,937	11,937.00	381	19,812	16,245.84
Sweet potatoes.....bu.	67	3,551	4,438.75	26	1,898	1,898.00
Castor-beans.......bu.	....	....	....	....	....	....
Cotton.............lbs.	5	1,500	150.00	28	1,960	196.00
Flax...............bu.	1,111	3,889	6,805.75	283	1,981	2,971.50
Tobacco............lbs.	2	1,600	160.00	....	....	....
Broom-corn.........lbs.	52	20,800	1,852.00	55	22,000	880.00
Millet & hungarian, tons	1,017	2,034	14,238.00	657	1,149	6,606.75
Sugar-beets.......tons	1	6	30.00	3	24	120.00
Sorghum for—						
syrup or sugar...gals.	151	12,231	5,998.19	186	12,090	5,803.20
forage or grain..tons	2,277	....	22,770.00	4,329	....	43,290.00
Milo maize........tons	65	195	1,268.00	141	211	1,266.00
Kafir-corn........tons	10,091	35,319	211,914.00	22,847	45,694	228,470.00
Jerusalem corn....tons	33	116	696.00	5	10	50.00
Timothy...........tons	3,458	* 9,859	108,449.00	825	† 9,288	92,880.00
Clover............tons	1,810			473		
Biue-grass........tons	1,793			572		
Alfalfa...........tons	3,786			5,602		
Orchard-grass.....tons	45			33		
Other tame grasses, tons	676			160		
Prairie-grass fnc'd, tons	86,482	19,132	172,188.00	72,807	18,034	144,272.00
Totals.............	223,806	....	$1,577,728.03	199,065	....	$1,465,587.70

Corn on hand March 1, 1911, 132,814 bushels; March 1, 1912, 82,026 bushels.
Wheat on hand March 1, 1911, 24,758 bushels; March 1, 1912, 29,426 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—MONTGOMERY COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops .... acres	223,306	$1,577,728.03	199,065	$1,465,587.70
Animals slaughtered and sold for slaughter....	....	460,437.00	....	369,426.00
Poultry and eggs sold..........................	....	135,276.00	....	111,140.00
Wool clip.................................. lbs.	1,660	282.20	1,181	226.20
Cheese..................................... lbs.	....	....	....	....
Butter..................................... lbs.	492,072	118,097.28	476,940	122,595.00
Milk sold....................................	....	50,817.00	....	61,236.00
Honey and beeswax...................... lbs.	1,352	202.80	560	84.00
Wood marketed..............................	....	767.00	....	170 00
Totals..................................	....	$2,343,607.31	....	$2,130,464.90

LIVE STOCK.—MONTGOMERY COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	12,992	$1,468,096.00	12,568	$1,420,184.00	297	363
Mules and asses	2,881	377,411.00	3,396	444,876.00	28	22
Milch cows....................	10,270	410,800.00	11,271	507,195.00	195	322
Other cattle..................	13,341	360,207.00	12,383	396,256.00	351	707
Sheep	897	3,767.40	1,189	5,053.25	16	79
Swine.........................	24,421	244,210.00	25,692	256,920 00	574	1,876
Totals....................	64,802	$2,864,491.40	66,499	$3,030,484.25	1,461	3,369

Number of dogs in county March 1, 1911, 2288; March 1, 1912, 2122.
Number of sheep killed by dogs, year ending March 1, 1911, 37; March 1, 1912, 4.
Number of sheep killed by wolves, year ending March 1, 1912, 6.

MORRIS COUNTY.

Organized in 1858; area, 700 square miles; population, 11,484; rank in population, 59; assessed valuation, $21,802,002; miles of railroad, main track, 106.88; county seat, Council Grove, population, 2581.

POPULATION AND VALUATION.—MORRIS COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......	12,025	11,484	$12,043,880	$1,652,078	$3,765,916	$4,340,128	$21,802,002
Clark's Creek tp...	584	573	$897,120	$12,530	$174,580	$361,216	$1,445,446
Council Grove.....	2,592 } 2,997	2,581 } 2,855	....	1,082,510	629,065	151,491	1,863,066
Council Grove tp..	405	274	632,750	....	120,738	320,647	1,074,135
Diamond Valley tp.	723	738	1,242,180	36,694	372,687	547,239	2,198,800
Wilsey............	297 } 1,215	314 } 1,201	....	88,770	124,863	30,348	243,981
Elm Creek tp......	918	887	1,514,350	3,130	295,857	347,349	2,160,686

POPULATION AND VALUATION.—MORRIS COUNTY.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
Four Mile tp......	306	261	$539,030	....	$80,725	$329	$620,084
Garfield tp........	449	452	642,170	$520	182,098	405,849	1,230,637
Delevan..........	84 } 737	82 } 715	1,317,140	24,360	234,500	478,091	2,049,091
Grandview tp.....	653 }	633 }					
Highland tp......	451	422	666,570	....	125,540	257,903	1,050,013
Neosho tp........	601	605	858,790	3,954	207,160	140,341	1,210,245
Dwight..........	206 } 853	238 } 779	....	91,680	145,490	52,009	289,179
Ohio tp..........	647 }	541 }	795,930	....	157,435	330,925	1,284,290
Parkersville......	133 } 787	133 } 771	....	38,710	33,323	18,606	90,639
Parker tp........	654 }	638 }	964,350	....	180,670	364,089	1,509,109
White City.......	576 } 1,166	448 } 958	....	202,290	226,977	93,822	523,089
Rolling Prairie tp..	590 }	510 }	731,510	8,090	153,827	322,363	1,215,790
Dunlap..........	301 } 665	283 } 671	....	58,840	56,961	19,585	135,386
Valley tp.........	364 }	388 }	646,640	....	127,150	102,688	876,478
Warren tp........	491	483	595,350	....	136,270	238	731,858

FARM AND CROP STATISTICS.—MORRIS COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	5,480	104,120	$91,625.60	7,232	115,712	$92,569.60
Spring wheat.......bu.	....	....	....	25	350	262.50
Corn...............bu.	84,872	1,273,080	700,194.00	71,277	1,781,925	944,420.25
Oats...............bu.	12,239	220,302	88,120.80	5,179	129,475	51,790.00
Rye................bu.	30	540	432.00	76	1,520	1,094.40
Barley.............bu.	....	....	....	38	950	427.50
Emmer ("speltz")..bu.	26	520	234.00	....	....	....
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	724	15,928	18,317.20	523	44,978	33,283.72
Sweet potatoes......bu.	1	48	60.00	1	98	88.20
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	247	741	1,333.80	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	....	....	....	....	....	....
Millet & hungarian, tons	6,905	10,358	62,148.00	5,600	11,200	56,000.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	42	2,940	1,470.00	67	5,025	2,512.50
forage or grain..tons	4,904	....	44,186.00	9,147	....	100,617.00
Milo maize........tons	43	129	774.00	25	62	310.00
Kafir-corn.........tons	10,058	40,232	201,160.00	17,055	51,165	204,660.00
Jerusalem corn....tons	....	....	....	....	....	....
Timothy...........tons	317	* 16,189	145,701.00	62	† 12,841	115,569.00
Clover............tons	330			155		
Blue-grass........tons	280			69		
Alfalfa...........tons	12,362			12,478		
Orchard-grass.....tons	11			8		
Other tame grasses, tons	23			190		
Prairie-grass fnc'd, tons	162,872	19,445	155,560.00	150,227	9,058	68,406.00
Totals.............	301,766	....	$1,511,266.40	279,434	....	$1,667,010.67

Corn on hand March 1, 1911, 356,403 bushels; March 1, 1912, 167,823 bushels.
Wheat on hand March 1, 1911, 3025 bushels; March 1, 1912, 3840 bushels.

* Product of 1910. † Product of 1911.

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SUMMARY.—MORRIS COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops.....acres	301,766	$1,511,266.40	279,434	$1,667,010.67
Animals slaughtered and sold for slaughter....	....	1,596,293.00	....	1,468,284.00
Poultry and eggs sold.....	....	106,165.00	....	94,531.00
Wool clip.....lbs.	1,715	291.55	4,800	960.00
Cheese.....lbs.	100	13.00	....	....
Butter.....lbs.	717,109	203,186.16	580,194	160,848.50
Milk sold.....	....	82,521.00	....	65,003.00
Honey and beeswax.....lbs.	7,978	1,196.95	1,517	227.55
Wood marketed.....	....	355.00	....	1,035 00
Totals.....	....	$3,501,288.06	....	$3,457,899.72

LIVE STOCK.—MORRIS COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses.....	9,811	$1,108,643.00	9,778	$1,104,349.00	174	220
Mules and asses.....	1,682	220,342.00	1,784	238,704.00	14	8
Milch cows.....	9.572	882,880.00	10,678	480,510.00	50	109
Other cattle.....	28,778	776,871.00	23,981	767,392.00	264	239
Sheep.....	1,193	5.010.60	1,705	7,246.25	20	25
Swine.....	28,213	282,180.00	22,773	227,730.00	1,350	5,225
Totals.....	79,244	$2,775,876.60	70,694	$2,820,931.25	1,872	5,826

Number of dogs in county March 1, 1911, 1885; March 1, 1912, 1580.
Number of sheep killed by dogs, year ending March 1, 1911, 6; March 1, 1912, 4.
Number of sheep killed by wolves, year ending March 1, 1911, 6; March 1, 1912, 3.

MORTON COUNTY.

Organized in 1886; area, 729 square miles; population, 1333; rank in population, 101; assessed valuation, $2,238,167; county seat, Richfield.

POPULATION AND VALUATION.—MORTON COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......	1,287	1.333	$1,890,231	$8.370	$339,438	$128	$2.238.167
Cimarron tp......	660	727	$778,906	....	$153,469	....	$932,375
Richfield tp.......	280	259	536,335	$8,370	125,855	$128	670,688
Taloga tp.........	*347	347	574,990	....	60,114	....	635,104

* United States government census 1910; no return made in 1911.

FARM AND CROP STATISTICS.—Morton County.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	685	2,055	$1,644.00	604	6,040	$4,530.00
Spring wheat.......bu.	3	....	....	....	....	....
Corn...............bu.	1,995	29,925	17,955.00	1,192	21,456	11,157.12
Oats...............bu.	144	....	....	97	2,231	937.02
Rye................bu.	6	30	25.20	1	10	7.00
Barley.............bu.	128	640	352.00	267	6,942	3,332.16
Emmer ("speltz")..bu.	50	....	....	65	1,170	585.00
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	2	30	37.50	7	315	299.25
Sweet potatoes......bu.	....	....	....	1	70	70.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	3,667	1,283,450	77,007.00	3,992	1,397,200	34,930.00
Millet & hungarian, tons	24	24	168.00	33	49	245.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	20	1,000	500.00	15	750	375.00
forage or grain..tons	3,711	....	22,266.00	3,696	....	33,264.00
Milo maize........tons	8,545	12,818	102,544.00	8,864	26,592	132,960 00
Kafir-corn........tons	2,168	3,252	26,016.00	2,641	5,282	26,410.00
Jerusalem corn....tons	111	167	1,336.00	77	154	770.00
Timothy..........tons	....			....		
Clover...........tons	....			....		
Blue-grass........tons	....	*..........	....	....		
Alfalfa...........tons	....			30	†..........	....
Orchard-grass.....tons	....			....		
Other tame grasses, tons	....			....		
Prairie-grass fnc'd, tons	45,041	300	2,700.00	48,130	35	210.00
Totals.............	66,300	....	$252,550.70	69,712	....	$250,081.55

Wheat on hand March 1, 1911, 157 bushels.

*** Product of 1910. † Product of 1911.**

SUMMARY.—Morton County.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops..........................acres	66,300	$252,550.70	69,712	$250,081.55
Animals slaughtered and sold for slaughter....	....	20,935.00	....	35,297.00
Poultry and eggs sold..........................	....	2,062.00	....	1,458.00
Wool clip................................lbs.	....	....	....	....
Cheese..................................lbs.	....	....	15	2.10
Butter..................................lbs.	17,002	4,080.48	15,255	3,813.75
Milk sold.....................................	....	197.00	....	775.00
Honey and beeswax.....................lbs.	....	....	....	....
Wood marketed................................	....	....	....	....
Totals..	....	$279,825.18	....	$291,427.40

LIVE STOCK.—MORTON COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	1,988	$218,994.00	2,085	$229,955.00	40	72
Mules and asses	640	83,840.00	631	89,211.00	3	9
Milch cows	2,585	101,400.00	2,629	118,305.00	10	42
Other cattle	5,638	152,226.00	5,182	165,824.00	132	266
Sheep	1	4.20	2	8.50	....	....
Swine	830	3,300.00	541	5,410.00	8	24
Totals	11,082	$559,764.20	11,070	$608,713.50	193	413

Number of dogs in county March 1, 1911, 231; March 1, 1912, 191.

NEMAHA COUNTY.

Organized in 1855; area, 720 square miles; population, 20,107; rank in population, 26; assessed valuation, $40,166,656; miles of railroad, main track, 93.77; county seat, Seneca, population, 2283.

POPULATION AND VALUATION.—NEMAHA COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county		20,224		20,107	$26,080,822	$2,772,925	$7,989,662	$3,373,247	$40,166,656
Adams tp		643		624	$1,262,150	$3,760	$195,740	$38,963	$1,500,613
Berwick tp		685		670	1,562,712	2,930	373,298	168,513	2,107,440
Capioma tp		752		726	1,222,888	4,980	218,110	8,885	1,449,863
Center tp		651		680	1,450,983	....	183,680	17,469	1,652,132
Clear Creek tp		557		561	1,018,000	....	138,970	1,298	1,158,263
Oneida	266	899	278	846	....	76,200	101,000	16,147	193,347
Gilman tp	633		578		1,435,761	....	224,040	215,280	1,875,081
Granada tp		697		640	1,185,458	....	156,540	1,961	1,293,959
Goffs	407	1,254	464	1,300	....	129,360	176,126	33,475	338,961
Harrison tp	847		836		1,037,886	18,810	217,678	462,165	1,736,089
Centralia	680	1,289	696	1,320	.....	269,700	325,930	26,072	621,702
Home tp	609		624		1,372,620	....	157,030	216,041	1,745,691
Corning	447	1,189	443	1,089	....	161,340	204,260	28,960	394,550
Illinois tp	742		646		1,261,392	....	208,700	294,452	1,764,544
Marion tp		701		748	1,549,052	54,090	442,580	250,806	2,296,528
Mitchell tp		713		701	1,408,982	....	201,520	191,066	1,801,568
Nemaha tp		524		508	1,285,037	....	294,230	1,275	1,580,542
Neuchatel tp		570		570	973,149	....	216,760	694	1,190,603
Red Vermillion tp.		579		564	1,096,982	320	127,300	513	1,225,065
Reilly tp		669		681	1,160,315	....	178,230	182,975	1,471,520
Seneca	2,186	3,006	2,283	3,097	......	811,050	809,900	104,163	1,725,118
Richmond tp	870		814		1,590,387	12,170	402,780	218,618	2,223,905
Sabetha	2,002	2,699	2,045	2,763	....	801,025	1,012,180	101,718	1,914,918
Rock Creek tp	697		718		1,549,231	....	313,480	248,855	2,111,566
Bern	*....	950	295	929	....	110,280	207,490	21,685	339,455
Washington tp	950		634		1,472,834	......	290,928	224,084	1,987,346
Wetmore	528	1,197	479	1,140	......	303,700	363,020	33,397	699,117
Wetmore tp	669		661		1,186,053	13,210	249,230	318,782	1,767,275

* Not shown separately from township in 1911.

FARM AND CROP STATISTICS.—NEMAHA COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	22,396	425,524	$361,695.40	11,802	200,634	$164,519.88
Spring wheat.......bu.	222	3,166	2,479.50	65	810	618.00
Corn...............bu.	157,298	2,359,470	1,250,519.10	177,029	3,716,609	2,044,684.95
Oats...............bu.	33,574	470,036	178,613.68	31,426	974,206	331,230.04
Rye................bu.	152	2,432	2,067.20	356	5,340	3,738.00
Barley.............bu.	150	3,000	1,650.00	70	1,400	630.00
Emmer ("speltz")..bu.	126	2,268	952.56	54	1,026	430.92
Buckwheat.........bu.	9	81	81.00	....	....	....
Irish potatoes.......bu.	1,321	27,741	26,908.77	1,346	100,950	72,684.00
Sweet potatoes......bu.	3	120	150.00	5	500	450.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	1	200	20.00
Flax...............bu.	5	25	43.75	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	10	4,500	292.50	....	....	....
Millet & hungarian, tons	11,289	16,934	118,538.00	14,443	21,664	129,984.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	101	10,100	5,050.00	150	9,750	4,387.50
forage or grain..tons	807	....	10,491.00	1,597	....	15,970.00
Milo maize........tons	7	21	126.00	13	32	160.00
Kafir-corn........tons	881	3,524	19,382.00	2,424	6,060	30,300.00
Jerusalem corn....tons	5	20	110.00	34	85	425 00
Timothy..........tons	18,489	* 28,270	325,105.00	13,351	† 13,881	133,810.00
Clover............tons	5,241			4,275		
Blue-grass........tons	2,027			3,961		
Alfalfa...........tons	8,983			11,254		
Orchard-grass.....tons	39			16		
Other tame grasses, tons	1,199			1,255		
Prairie-grass fnc'd, tons	112,172	14,798	147,980.00	112,281	7,695	65,407.50
Totals............	376,506	....	$2,452,235.46	387,208	....	$2,999,449.79

Corn on hand March 1, 1911, 1,723,775 bushels; March 1, 1912, 802,678 bushels.
Wheat on hand March 1, 1911, 4415 bushels; March 1, 1912, 8185 bushels.

*** Product of 1910. † Product of 1911.**

SUMMARY.—NEMAHA COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops..........................acres	376,506	$2,452,235.46	387,208	$2,999,449.79
Animals slaughtered and sold for slaughter....	....	1,756,898 00	....	1,823,212.00
Poultry and eggs sold..........................	....	222,380 00	....	197,346.00
Wool clip..............................lbs.	8,605	1,462.85	6,237	1,247.40
Cheese.................................lbs.	75	9.75	2,185	305.90
Butter.................................lbs.	302,393	72,574.82	281,061	70,265.25
Milk sold......................................	....	131,283.00	....	141,818.00
Honey and beeswax....................lbs.	45,534	6,924.40	12,623	1,912.45
Wood marketed..............................	....	3,249.00	....	3,308.00
Totals..	....	$4,650,016.78	....	$5,238,864.79

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LIVE STOCK.—NEMAHA COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	15,272	$1,725,736.00	14,586	$1,648,218.00	287	570
Mules and asses	2,746	859,726.00	2,823	369,813.00	23	29
Milch cows	10,744	429,760.00	11,782	526,590.00	106	99
Other cattle	20,559	555,093.00	15,396	492,672.00	179	259
Sheep	4,584	19,252.80	2,998	12,741.50	42	65
Swine	59,658	596,580.00	51,287	512,870.00	591	3,400
Totals	113,563	$3,686,147.80	98,792	$3,562,904.50	1,228	4,482

Number of dogs in county March 1, 1911, 3031; March 1, 1912, 3129.
Number of sheep killed by dogs, year ending March 1, 1911, 14; March 1, 1912, 30.
Number of sheep killed by wolves, year ending March 1, 1911, 12; March 1, 1912, 16.

NEOSHO COUNTY.

Organized in 1864; area, 576 square miles; population, 22,189; rank in population, 20; assessed valuation, $29,572,363; miles of railroad, main track, 122.87; county seat, Erie, population, 1200.

FARM AND CROP STATISTICS.—NEOSHO COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	9,825	176,850	$150,322.50	13,297	226,049	$194,402.14
Spring wheat.......bu.	....	....	....	....	....	....
Corn...............bu.	79,920	1,518,480	804,794.40	77,587	1,086,218	597,419.90
Oats...............bu.	22,759	113,795	45,518.00	10,505	273,130	101,058.10
Rye................bu.	120	1,200	1,008.00	78	1,170	865.80
Barley.............bu.	13	260	143.00	57	1,140	513.60
Emmer ("speltz")..bu.	4	60	27.00	....	....	....
Buckwheat..........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	618	20,842	20,842.00	406	28,826	21,042.98
Sweet potatoes......bu.	19	1,368	1,710.00	25	2,500	2,500.00
Castor-beans........bu.	4	36	45.00	42	336	336.40
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	15,083	45,249	81,448.20	6,713	33,565	50,347.50
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	95	47,500	3,325.00	185	33,250	3,330.00
Millet & hungarian, tons	600	900	6,300.00	750	1,125	6,750.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	116	10,092	4,541.40	189	18,797	6,484.59
forage or grain..tons	1,383	....	12,447.00	2,384	....	23,840.00
Milo maize........tons	21	74	444.00	159	397	1,985.00
Kafir-corn........tons	10,664	53,320	266,600.00	20,968	52,420	262,100.00
Jerusalem corn....tons	....	....	....	....	....	....
Timothy..........tons	5,859	* 8,821	88,210.00	2,447	† 5,504	57,792.00
Clover...........tons	6,751			3,461		
Blue-grass........tons	651			411		
Alfalfa...........tons	1,025			1,302		
Orchard-grass.....tons	7			16		
Other tame grasses, tons	1,117			542		
Prairie-grass fnc'd, tons	105,219	23,873	190,984.00	108,603	24,117	192,936.00
Totals	261,868	....	$1,678,709.50	250,077	....	$1,523,254.01

Corn on hand March 1, 1911, 326,363 bushels; March 1, 1912, 237,158 bushels.
Wheat on hand March 1, 1911, 11,130 bushels; March 1, 1912, 4518 bushels.

* Product of 1910. † Product of 1911.

POPULATION AND VALUATION.—NEOSHO COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county		22,795		22,189	$11,869,720	$5,538,875	$5,826,055	$6,837,713	$29,572,363
Big Creek tp		807		905	$890,633	....	$232,855	$181,884	$1,304,872
Earlton	211	815	211	810	1,018,526	$36,608	227,685	630,852	1,913,171
Canville tp	604		599						
Galesburg	202	1,016	202	1,010	....	66,276	93,715	9,279	169,270
Centerville tp	814		808		866,807	....	199,265	319,239	1,385,311
Thayer	516	1,349	556	1,452	....	207,701	244,450	42,297	494,448
Chetopa tp	833		896		938,960	14,714	223,095	392,715	1,569,484
Erie	1,255	2,202	1,200	2,128	....	546,868	354,075	59,717	960,660
Erie tp	947		928		992,024	23,939	242,960	599,680	1,858,603
Stark	209	1,267	212	1,117	....	48,196	74,645	88	122,879
Kimball	....		*....		....	....	....	....	....
Grant tp	1,058		905		976,072	11,321	252,005	303,924	1,543,322
Ladore tp		914		856	1,068,525	....	201,470	643,336	1,913,331
Lincoln tp		868		859	745,423	17,820	154,265	165,859	1,083,367
St. Paul	919	1,805	755	1,623	....	145,145	131,140	49,007	325,292
Mission tp	886		868		789,728	....	149,785	325,260	1,264,773
Shiloh tp		782		829	949,884	16,636	188,460	414,940	1,569,920
Chanute	8,701	10,142	8,413	9,686	....	4,837,518	1,733,780	438,418	6,509,666
Tioga tp	1,441		1,273		1,659,202	66,133	426,085	1,430,784	3,582,124
Walnut Grove tp		828		914	973,986	....	196,370	831,564	2,001,870

* Not shown separately from township in 1911 or 1912.

SUMMARY.—NEOSHO COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops ... acres	261,868	$1,678,709.50	250,077	$1,523,254.01
Animals slaughtered and sold for slaughter	....	566,956.00	....	467,577.00
Poultry and eggs sold	....	194,362.00	....	166,284.00
Wool clip ... lbs.	7,700	1,309.00	5,991	1,198.20
Cheese ... lbs.	299	38.87	....	....
Butter ... lbs.	340,793	84,932.22	267,568	67,872.00
Milk sold	....	102,760.00	....	84,958.00
Honey and beeswax ... lbs.	8,090	1,217.30	2,120	329.20
Wood marketed	....	659.00	....	429.00
Totals	....	$2,630,943.89	....	$2,311,901.41

LIVE STOCK.—NEOSHO COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	11,071	$1,251,023.00	11,463	$1,295,319.00	431	263
Mules and asses	2,416	316,496.00	2,414	316,234.00	13	23
Milch cows	8,657	346,280.00	9,350	420,750.00	233	164
Other cattle	14,156	382,212.00	11,484	367,488.00	492	315
Sheep	3,696	15,523.20	3,192	13,566.00	101	112
Swine	22,336	223,360.00	22,107	221,070.00	908	677
Totals	62,332	$2,534,894.20	60,010	$2,634,427.00	2,178	1,554

Number of dogs in county March 1, 1911, 2634; March 1, 1912, 2329.
Number of sheep killed by dogs, year ending March 1, 1911, 15; March 1, 1912, 5.
Number of sheep killed by wolves, year ending March 1, 1911, 7; March 1, 1912, 9.

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NESS COUNTY.

Organized in 1880; area, 1080 square miles; population, 6075; rank in population, 78; assessed valuation, $10,130,663; miles of railroad, main track, 75.20; county seat, Ness City, population, 740.

POPULATION AND VALUATION.—NESS COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......		6,240		6,075	$5,498,308	$352,763	$1,568,170	$2,711,427	$10,130,663
Bazine tp.........		758		776	$714,123	$11,376	$167,660	$392,331	$1,285,490
Ness City.........	802	986	740	884	....	194,797	284,735	36,281	515,818
Center tp..........	184		144		315,144	....	75,240	174,044	564,428
Eden tp..........		821		326	417,201	6,767	108,854	328,857	861,679
Forrester tp......		275		286	888,220	108	80,725	259,302	678,355
Franklin tp.......		537		498	774,167	298	121,850	226	896,541
High Point tp.....		565		678	576,894	360	127,418	2,010	706,677
Johnson tp........		201		168	461,528	1,242	42,540	150	505,460
Ransom..........	225	907	198	869	....	43,473	108,428	26,035	172,936
Nevada tp........	682		671		571,650	....	130,170	465,457	1,167,807
Utica.............	270	924	285	809	....	43,965	96,985	41,153	182,103
Ohio tp...........	654		524		664,889	7,098	115,940	432,981	1,220,853
Brownell.........	*....	766	*....	786	614,487	43,284	162,630	552,620	1,878,021
Waring tp........	766		786						

* Not reported separately from township in 1911 or 1912.

FARM AND CROP STATISTICS.—NESS COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	12,617	37,851	$32,930.37	53,896	431,168	$319,064.32
Spring wheat.......bu.	543	....	....	....	....	....
Corn...............bu.	59,210	118,420	75,788.80	21,856	415,264	211,784.64
Oats...............bu.	19,760	....	....	14,801	429,229	163,107.02
Rye................bu.	2,757	....	....	1,861	20,471	14,329.70
Barley.............bu.	12,966	....	....	3,429	65,151	27,363.42
Emmer ("speltz")..bu.	376	....	....	10	180	84.60
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	340	1,360	1,536.80	95	7,410	6,743.10
Sweet potatoes......bu.	....	....	....	4	400	400.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	230	23,000	1,380.00	120	48,000	,440.00
Millet & hungarian, tons	3,218	3,218	25,744.00	2,557	5,753	30,203.25
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	11	220	110.00	....	....	....
forage or grain..tons	23,800	....	142,800.00	18,456	....	184,560.00
Milo maize........tons	3,501	3,501	28,008.00	5,770	11,540	57,700.00
Kafir-corn........tons	16,350	16,350	130,800.00	12,816	38,448	173,016.00
Jerusalem corn....tons	398	398	3,184.00	182	546	2,457.00
Timothy..........tons	....			....		
Clover...........tons	....			....		
Blue-grass........tons	....	*		....	† 4,018	32,144.00
Alfalfa...........tons	4,136	9,919	109,109.00	3,771		
Orchard-grass.....tons	....		*	....		
Other tame grasses, tons	....			....		
Prairie-grass fnc'd, tons	234,431	2,464	22,176.00	185,708	2,720	14,960.00
Totals.............	394,644	....	$573,566.97	325,332	....	$1,239,357.05

Corn on hand March 1, 1911, 44,458 bushels; March 1, 1912, 2270 bushels.
Wheat on hand March 1, 1911, 59,791 bushels; March 1, 1912, 4805 bushels.
*** Product of 1910. † Product of 1911.**

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SUMMARY.—Ness County.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops....acres	394,644	$573,566.97	325,332	$1,239,357.05
Animals slaughtered and sold for slaughter....	....	102,415.00	....	63,164.00
Poultry and eggs sold....	....	62,730.00	....	36,240.00
Wool clip....lbs.	200	34.00	....	....
Cheese....lbs.	40	5.20	806	112.84
Butter....lbs.	74,582	17,899.68	66,675	16,668.75
Milk sold....	....	67,403.00	....	40,021.00
Honey and beeswax....lbs.	30	4.50	....	....
Wood marketed....	....	28.00	....	....
Totals....	....	$824,086.85	....	$1,395,563.64

LIVE STOCK.—Ness County.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses....	9,283	$1,048,979.00	8,873	$1,002,649.00	129	60
Mules and asses....	929	121,699.00	1,027	184,537.00	1	....
Milch cows....	8,436	337,440.00	7,030	316,850.00	47	26
Other cattle....	13,818	373,086.00	10,271	328,672.00	229	159
Sheep....	293	1,230.60	248	1,054.00	11	....
Swine....	3,896	38,960.00	1,708	17,080.00	32	31
Totals....	36,655	$1,921,394.60	29,157	$1,800,342.00	449	276

Number of dogs in county March 1, 1911, 920; March 1, 1912, 661.
Number of sheep killed by dogs, year ending March 1, 1911, 4.
Number of sheep killed by wolves, year ending March 1, 1911, 2.

NORTON COUNTY.

Organized in 1872; area, 900 square miles; population, 10,305; rank in population, 64; assessed valuation, $16,326,192; miles of railroad, main track, 89.07; county seat, Norton, population, 1760.

POPULATION AND VALUATION.—Norton County.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county....	10,572	10,305	$8,996,820	$1,408,125	$2,777,320	$3,143,927	$16,326,192
Aldine tp....	292	272	$337,685	....	$57,880	$1,624	$397,189
Almelo tp....	262	247	264,479	....	70,660	562	335,701
Almena....	550 } 1,096	591 } 1,116	....	$202,050	231,870	39,916	473,836
Almena tp....	546 }	525 }	809,691	....	145,330	386,810	1,341,831
Belle Plaine tp....	310	333	284,491	....	40,040	1,382	325,913

POPULATION AND VALUATION.—NORTON COUNTY.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
Norton..........	1,657	2,232	1,760	2,335	....	$962,270	$608,150	$116,593	$1,682,018
Center tp.........	575		575		$670,769	....	102,030	293,373	1,066,172
Clayton tp........		181		163	381,844	....	66,620	299,662	748,126
Crystal tp........		269		230	289,040	....	58,760	1,129	348,929
Emmett tp........		425		389	529,312	730	99,320	490,481	1,119,793
Garfield tp........		290		271	399,561	....	51,590	1,926	453,077
Grant tp..........		640		633	449,896	....	112,330	142,811	705,037
Harrison tp.......		342		365	332,542	....	72,090	1,158	405,790
Highland tp......		262		224	320,733	....	35,140	1,160	357,033
Lenora..........	434	721	426	636	....	126,535	325,170	6,874	458,579
Lenora tp........	287		210		394,261	....	62,690	59,388	516,339
Leota tp..........		471		430	554,528	15,360	101,370	668,473	1,339,731
Lincoln tp........		259		244	297,603	....	53,240	36,602	387,445
Modell tp.........		280		260	365,330	....	43,060	162,583	570,973
Clayton..........	*....	346	129	329	279,260	61,230	67,320	36,931	444,741
Noble tp..........	346		200						
Orange tp........		253		205	360,078	....	34,040	1,306	395,419
Rock Branch tp...		200		200	295,014	....	55,440	678	351,132
Rockwell tp.......		220		243	320,573	....	35,420	112,252	468,245
Sand Creek tp.....		328		278	292,572	....	43,100	1,217	336,889
Solomon tp........		447		460	323,632	25,040	100,300	106,584	555,506
West Union tp....		446		442	443,931	14,910	109,360	172,552	740,753

* Not reported separately from township in 1911.

FARM AND CROP STATISTICS.—NORTON COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	77,013	231,039	$184,831.20	68,331	478,317	$363,520.92
Spring wheat.......bu.	137	....	....	10	60	45.60
Corn...............bu.	91,915	183,830	119,489.50	105,747	1,692,952	846,476.00
Oats...............bu.	10,255	....	....	10,912	141,856	59,579.52
Rye................bu.	360	....	....	59	531	377.01
Barley.............bu.	1,023	....	....	136	1,360	584.80
Emmer ("speltz")..bu.	50	....	....	....	....	....
Buckwheat.........bu.	1	....	....	....	....	....
Irish potatoes.......bu.	902	9,020	8,569.00	710	44,730	36,231.30
Sweet potatoes......bu.	3	60	75.00	....	....	....
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	4	20	30.00
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	....	....	....	....	....	....
Millet & hungarian, tons	2,328	3,492	24,444.00	2,455	5,523	27,615.00
Sugar-beets.......tons	1	....	....	4	36	1.80
Sorghum for—						
syrup or sugar...gals.	204	4,080	2,040.00	635	44,450	21,336.00
forage or grain..tons	24,257	....	194,056.00	14,008	....	133,076.00
Milo maize........tons	7,780	11,670	81,690.00	4,896	12,240	61,200.00
Kafir-corn........tons	20,180	40,360	262,340.00	15,138	45,414	181,656.00
Jerusalem corn....tons	63	126	819.00	281	843	3,372.00
Timothy..........tons	....	* 13,790	137,900.00	....	† 16,255	130,040.00
Clover............tons	....			....		
Blue-grass........tons	1			....		
Alfalfa...........tons	14,875			10,684		
Orchard-grass.....tons	....			50		
Other tame grasses, tons	21			6		
Prairie-grass fnc'd, tons	152,026	946	7,568.00	153,691	4,520	27,120.00
Totals............	403,395	....	$1,023,821.70	387,757	....	$1,892,440.15

Corn on hand March 1, 1911, 45,155 bushels; March 1, 1912, 12,138 bushels.
Wheat on hand March 1, 1911, 53,945 bushels; March 1, 1912, 4247 bushels.

*** Product of 1910. † Product of 1911.**

SUMMARY.—NORTON COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops ... acres	403,395	$1,023,821.70	387,757	$1,892,440.15
Animals slaughtered and sold for slaughter	....	489,197 00	....	267,087.00
Poultry and eggs sold	....	103,674.00	....	72,555.00
Wool clip ... lbs.	4,692	797 64	1,193	238.60
Cheese ... lbs.	....	....	4	.56
Butter ... lbs.	205,018	49,204.32	193,440	48,360.00
Milk sold	....	80,220.00	....	73.026.00
Honey and beeswax ... lbs.	1,889	283.35	2,615	392.25
Wood marketed	....	610.00	....	459.00
Totals	....	$1,747,808 01	....	$2.354.558.56

LIVE STOCK.—NORTON COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	11,406	$1,288,878.00	11.354	$1,283,002.00	192	249
Mules and asses	1,837	240,647.00	1,968	257,808.00	23	12
Milch cows	7,330	293,200.00	7,492	337,140.00	145	183
Other cattle	9,756	263,412.00	9,457	302,624.00	308	356
Sheep	2,466	10,357.20	1,525	6,481.25	6	24
Swine	16,605	166,050.00	9,791	97,910.00	280	1,196
Totals	49.400	$2,262,544.20	41,587	$2,284,965.25	954	2.020

Number of dogs in county March 1, 1911, 1575; March 1, 1912, 1425.
Number of sheep killed by dogs, year ending March 1, 1911, 8; March 1, 1912, 2.
Number of sheep killed by wolves, year ending March 1, 1912, 9.

OSAGE COUNTY.

Organized in 1859; area, 720 square miles; population, 20,045; rank in population, 27; assessed valuation, $31,505,834; miles of railroad, main track, 139.17; county seat, Lyndon, population, 764.

POPULATION AND VALUATION.—OSAGE COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county	**20,404**	**20.045**	**$17,025,914**	**$2.559,753**	**$4.887.410**	**$7.032.757**	**$31,505,834**
Quenemo	**584 } 1,127**	**591 } 1,081**	....	**$194,420**	**$128,435**	**$129,931**	**$452,786**
Agency tp	**543**	**440**	**$731,297**	....	**109,255**	**984,404**	**1,824,956**
Arvonia tp	**545**	**584**	**906,362**	**4,605**	**203,540**	**238,282**	**1,252,789**
Barclay tp	**627**	**654**	**1,060,430**	**4,290**	**159,415**	**594,077**	**1,818,212**
Burlingame	**1,520 } 2,975**	**1,434 } 2,806**	....	**576,470**	**410,070**	**84,233**	**1,070,373**
Burlingame tp	**1,455**	**1,372**	**1,867,048**	....	**295,520**	**404,333**	**2,566,901**

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POPULATION AND VALUATION.—OSAGE COUNTY.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
Dragoon tp.	593	645	$976,357	....	$188,470	$208,423	$1,373,250
Elk tp.	1,265	1,190	1,457,246	$224,995	603,460	287,068	2,572,769
Fairfax tp.	740	710	1,139,958	....	220,540	3,080	1,363,578
Osage City	2,757 } 3,697	3,010 } 3,926	....	791,360	451,400	271,137	1,513,897
Grant tp.	940	916	1,039,099	10,330	152,095	402,933	1,604,457
Junction tp.	997	1,000	1,238,789	22,515	285,735	344,333	1,891,322
Lincoln tp.	612	575	595,877	3,345	94,705	166,090	860,017
Melvern	446 } 1,265	416 } 1,146	....	110,240	133,665	62,682	309,587
Melvern tp.	819	730	933,730	....	160,885	417,621	1,512,236
Olivet tp.	866	889	1,204,243	30,775	245,475	586,538	2,067,031
Carbondale	468 } 1,115	487 } 1,133	....	106,165	105,000	38,112	249,277
Ridgeway tp.	647	646	1,051,471	....	183,810	406,580	1,641,861
Scranton	798 } 1,649	733 } 1,543	....	119,188	73,570	102,748	295,506
Scranton tp.	851	810	882,215	....	113,475	242,993	1,238,683
Superior tp.	859	809	920,529	59,095	136,880	578,193	1,694,697
Lyndon	786 } 1,472	764 } 1,454	....	302,360	210,200	20,506	533,066
Valley Brook tp.	686	690	1,021,313	....	218,810	558,460	1,798,583

FARM AND CROP STATISTICS.—OSAGE COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	6,857	157,711	$188,785.68	15,896	286,128	$240,847.52
Spring wheat.......bu.	162	2,850	2,320.50	....	....	....
Corn...............bu.	97,630	1,464,450	849,381.00	86,772	1,995,756	1,057,750.68
Oats...............bu.	19,960	259,480	103,792.00	7,393	243,969	90,268.53
Rye................bu.	124	1,984	1,686.40	307	5,219	3,862.06
Barley.............bu.	48	1,200	624.00	....	....	....
Emmer ("speltz")..bu.	42	530	283.50	60	1,320	594.00
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	887	15,079	13,571.10	783	64,504	43,217.68
Sweet potatoes......bu.	6	480	470.40	1	75	63.75
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	4,529	15,852	28,533.60	1,378	9,611	14,416.50
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	1	500	32.50	....	....	....
Millet & hungarian, tons	1,716	2,574	16,731.00	960	1,440	7,920.00
Sugar-beets.......tons	....	....	....	45	450	2,250.00
Sorghum for—						
syrup or sugar...gals.	334	25,050	12,024.00	193	14,475	7,237.50
forage or grain..tons	3,138	....	25,104.00	5,248	....	57,728.00
Milo maize........tons	32	64	384.00	48	144	648.00
Kafir-corn........tons	10,878	43,512	239,316.00	22,045	66,135	297,607.50
Jerusalem corn....tons	....	....	....	82	246	1,107.00
Timothy...........tons	11,845	* 19,081	228,372.00	6,890	† 9,116	100,276.00
Clover............tons	11,945			6,892		
Blue-grass........tons	2,913			1,417		
Alfalfa...........tons	4,279			5,493		
Orchard-grass.....tons	38			15		
Other tame grasses, tons	943			135		
Prairie-grass fnc'd, tons	135,488	30,656	275,904.00	131,399	15,591	182,523.5
Totals.............	313,795	....	$1,937,815.68	293,397	....	$2,057,818.22

Corn on hand March 1, 1911, 489,260 bushels; March 1, 1912, 116,073 bushels.
Wheat on hand March 1, 1911, 1415 bushels; March 1, 1912, 1875 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—Osage County.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops .... acres	318,795	$1,987,315.68	293,397	$2,057,818.22
Animals slaughtered and sold for slaughter	....	1,229,896.00	....	1,043,869.00
Poultry and eggs sold	....	171,668.00	....	154,705.00
Wool clip .... lbs.	8,820	1,499.40	5,890	1,178.00
Cheese .... lbs.	20	2 60	100	14.00
Butter .... lbs.	426,227	111,818.00	264,767	69,087.43
Milk sold	....	120,589.00	....	104,434.00
Honey and beeswax .... lbs.	8,743	1,330.45	3,577	544.85
Wood marketed	....	705.00	....	474.00
Totals	....	$3,574,819.13	....	$3,432,124.50

LIVE STOCK.—Osage County.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	13,242	$1,496,346.00	12,451	$1,406,963.00	174	233
Mules and asses	2,322	304,182.00	2,448	320,688.00	12	15
Milch cows	11,032	441,280.00	12,233	550,485.00	94	120
Other cattle	22,442	605,934.00	17,948	574,836.00	232	114
Sheep	3,901	16,884.20	2,347	9,974.75	140	72
Swine	33,984	339,840.00	29,756	297,560.00	613	2,096
Totals	86,923	$3,203,966.20	77,183	$3,160,006.75	1,265	2,650

Number of dogs in county March 1, 1911, 2341; March 1, 1912, 2235.
Number of sheep killed by dogs, year ending March 1, 1911, 18; March 1, 1912, 9.
Number of sheep killed by wolves, year ending March 1, 1911, 1; March 1, 1912, 5.

OSBORNE COUNTY.

Organized in 1871; area, 900 square miles; population, 12,429; rank in population, 52; assessed valuation, $24,042,250; miles of railroad, main track, 50.25; county seat, Osborne, population, 1561.

POPULATION AND VALUATION.—Osborne County.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county		12,654		12,429	$15,227,800	$2,274,155	$5,164,070	$1,376,225	$24,042,250
Portis	296	707	287	698	....	$129,465	$150,105	$2,081	$281,651
Bethany tp	411		411		$983,250	....	149,820	159,628	1,292,698
Bloom tp		497		543	818,190	....	179,905	2,403	1,000,498
Corinth tp		417		393	911,430	....	135,075	56,403	1,102,908
Covert tp		327		250	446,720	2,960	138,280	1,282	589,262
Delhi tp		463		431	683,570	....	179,790	1,891	865,251
Grant tp		291		310	511,610	....	110,940	714	623,264

POPULATION AND VALUATION.—OSBORNE COUNTY.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
Hancock tp........	316	308	$591,340	....	$133,320	$529	$725,189
Hawkeye tp.......	350	329	477,130	....	103,560	841	581,531
Independence tp...	279	256	481,700	....	120,510	439	602,649
Jackson tp........	426	421	548,920	....	136,685	2,171	687,776
Kill Creek tp......	282	328	475,900	....	136,310	433	612,643
Lawrence tp......	321	327	581,400	....	97,090	818	679,308
Liberty tp........	247	238	443,470	....	88,170	40,347	571,987
Mt. Ayer tp.......	346	333	499,400	....	133,770	555	633,725
Natoma..........	446 } 706	418 } 679	....	$154,250	203,500	20,112	377,862
Natoma tp........	260	261	441,780	....	68,300	187,650	697,730
Osborne..........	1,649 } 2,118	1,561 } 1,994	....	972,820	1,088,120	42,381	2,103,321
Penn tp..........	469	433	1,315,980	8,590	250,760	161,749	1,737,079
Downs...........	1,333 } 1,865	1,404 } 1,971	....	841,645	408,055	100,166	1,349,866
Ross tp...........	532	567	1,188,190	....	205,110	188,494	1,581,794
Round Mound tp..	333	347	467,790	....	94,070	804	562,664
Alton............	411 } 967	376 } 959	....	157,865	240,855	19,836	418,556
Sumner tp........	556	583	958,250	....	146,920	206,948	1,312,118
Tilden tp.........	464	405	944,800	6,540	147,385	175,919	1,274,644
Valley tp.........	336	298	593,050	....	116,215	317	709,582
Victor tp.........	382	377	463,330	....	108,390	884	572,604
Winfield tp.......	214	234	400,600	....	93,060	435	494,095

FARM AND CROP STATISTICS.—OSBORNE COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	65,326	261,304	$224,721.44	130,073	2,081,168	$1,581,687.68
Spring wheat.......bu.	146	....	....	....	....	....
Corn...............bu.	108,950	326,850	202,647.00	69,746	2,022,634	970,864 32
Oats...............bu.	14,182	....	....	4,852	155,264	65,210.88
Rye................bu.	130	....	....	141	2,538	1,776.60
Barley.............bu.	9,631	....	....	10	220	96.80
Emmer ("speltz")..bu.	36	....	....	....	....	....
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	911	....	....	614	46,050	37,300.50
Sweet potatoes......bu.	....	....	....	....	....	....
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	....	....	....	25	12,500	437.50
Millet & hungarian, tons	735	1,103	7,721.00	576	1,296	6,480.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	33	1,320	660.00	108	7,560	3,780.00
forage or grain..tons	11,673	....	58,365.00	10,350	....	124,200.00
Milo maize........tons	24	36	252.00	130	390	1,950.00
Kafir-corn........tons	10,407	20,814	124,884 00	12,418	49,672	198,688.00
Jerusalem corn....tons	1	2	12.00	5	20	80.00
Timothy...........tons	....	* 25,227	227,043.00	1	† 15,869	126,952.00
Clover............tons	....			....		
Blue-grass........tons	2			....		
Alfalfa...........tons	22,251			20,085		
Orchard-grass.....tons	....			....		
Other tame grasses, tons	2			....		
Prairie-grass fnc'd, tons	220,044	7,876	63,008.00	203,256	4,680	30,420.00
Totals............	464,484	....	$909,313.44	452,390	....	$3,149,924.28

Corn on hand March 1, 1911, 392,036 bushels; March 1, 1912, 44,278 bushels.
Wheat on hand March 1, 1911, 248,425 bushels; March 1, 1912, 42,168 bushels.

*** Product of 1910. † Product of 1911.**

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SUMMARY.—OSBORNE COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops....acres	464,484	$909,813.44	452,890	$3,149,924 28
Animals slaughtered and sold for slaughter....	....	910,728.00	....	592,855.00
Poultry and eggs sold....	....	152,654.00	....	112,417.00
Wool clip....lbs.	4,040	686.80	1,150	230.00
Cheese....lbs.	300	39.00	400.00	56.00
Butter....lbs.	247,650	59,436.00	219,360	54,840.00
Milk sold....	....	106,756.00	....	100,864.00
Honey and beeswax....lbs.	20,217	3,041.55	2,342	352.30
Wood marketed....	....	386.00	....	1 343 00
Totals....	....	$2,143,035.79	....	$4,012,881.58

LIVE STOCK.—OSBORNE COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses....	14,365	$1,623,245.00	14,046	$1,587,198.00	145	185
Mules and asses....	2,424	317,544.00	2,628	344,268.00	8	9
Milch cows....	11,091	443,640.00	11,464	515,880.00	68	83
Other cattle....	26,342	711,234.00	20,495	655,840.00	369	389
Sheep....	2,215	9,303.00	788	3,349.00	29	58
Swine....	33,870	338,700.00	20,303	203,030.00	685	1,978
Totals....	90,307	$3,443,666.00	69,724	$3,309,565.00	1,304	2,702

Number of dogs in county March 1, 1911, 1991; March 1, 1912, 1887.
Number of sheep killed by dogs, year ending March 1, 1911, 1; March 1, 1912, 8.
Number of sheep killed by wolves, year ending March 1, 1911, 10; March 1, 1912, 12.

OTTAWA COUNTY.

Organized in 1866; area, 720 square miles; population, 11,547; rank in population, 58; assessed valuation, $26,908,714; miles of railroad, main track, 79.22; county seat, Minneapolis, population, 1888.

POPULATION AND VALUATION.—OTTAWA COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county....		11,605		11,547	$16,653,775	$2,244,883	$5,102,250	$2,907,806	$26,908,714
Bennington.... Bennington tp....	402 367	769	426 403	829	$907,295	$175,265	$378,445	$88,885	$1,549,890
Blaine tp....		413		368	865,050	....	158,530	180,865	1,204,445
Buckeye tp....		314		370	1,027,205	2,560	162,680	183,895	1,376,340
Center tp....		296		334	939,445	....	156,275	262,175	1,357,895
Chapman tp....		412		294	519,615	....	115,520	122,355	757,490

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POPULATION AND VALUATION.—OTTAWA COUNTY.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
Minneapolis	1,888	2,294	1,888	2,306	....	$1,271,115	$1,082,825	$124,381	$2,477,821
Concord tp	406		417		$1,214,270	768	192,180	245,405	1,652,623
Culver	284	709	291	786	965,570	99,065	277,010	145,255	1,486,900
Culver tp	425		495						
Durham tp		159		176	438,680	....	75,595	11,340	525,615
Ada	205	627	177	610	779,095	54,155	343,930	251,885	1,428,565
Fountain tp	422		433						
Garfield tp		449		450	1,413,425	....	281,590	215,110	1,910,125
Wells	50	326	44	342	537,440	14,085	137,995	246,770	936,290
Grant tp	276		298						
Henry tp		252		196	386,295	....	83,845	10,045	479,685
Niles	208	539	218	539	843,815	19,370	196,545	76,305	1,136,035
Lincoln tp	331		321						
Logan tp		498		491	1,036,755	....	171,385	4,115	1,212,255
Tescott	426	877	426	865	849,965	143,140	330,950	196,020	1,520,075
Morton tp	451		439						
Ottawa tp		311		311	543,110	5,480	100,655	286,285	935,530
Richland tp		347		347	607,265	....	107,200	21,560	736,025
Delphos tp	788	1,264	742	1,191	1,630,085	459,880	534,175	227,955	2,852,095
Sheridan tp	476		449						
Sherman tp		378		379	550,845	....	110,405	1,070	662,820
Stanton tp		371		364	598,550	....	110,515	1,630	710,695

FARM AND CROP STATISTICS.—OTTAWA COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	96,034	1,248,442	$1,073,660.12	93,166	1,387,490	$1,128,866.90
Spring wheat.......bu.	54	540	424.90	....	....	....
Corn.......bu.	67,416	1,146,072	618,878.88	59,182	1,537,432	845,587.60
Oats.......bu.	14,067	281,840	101,282.40	10,467	308,543	124,452.62
Rye.......bu.	261	2,871	2,440.35	438	6,132	4,599.00
Barley.......bu.	23	276	188.00	15	375	161.25
Emmer ("speltz")..bu.	20	300	135.00	6	144	67.68
Buckwheat.......bu.	....	....	....	....	....	....
Irish potatoes.......bu.	610	9,150	11,986.50	445	32,485	25,988.00
Sweet potatoes.......bu.	7	700	875.00	8	664	664.00
Castor-beans.......bu.	....	....	....	....	....	....
Cotton.......lbs.	....	....	....	....	....	....
Flax.......bu.	....	....	....	....	....	....
Tobacco.......lbs.	....	....	....	....	....	....
Broom-corn.......lbs.	153	45,900	2,983.50	43	21,500	860.00
Millet & hungarian, tons	480	480	3,360.00	207	414	2,070.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	55	3,300	1,650.00	8	560	268.80
forage or grain..tons	4,065	....	32,520.00	5,914	....	59,140.00
Milo maize.......tons	21	63	347.00	4	10	50.00
Kafir-corn.......tons	4,724	18,896	94,480.00	7,667	26,834	107,336.00
Jerusalem corn....tons	13	52	260.00	....	....	....
Timothy.......tons	....	* 22,982	229,820.00	....	† 15,860	150,670.00
Clover.......tons	....			....		
Blue-grass.......tons	3			....		
Alfalfa.......tons	12,330			12,517		
Orchard-grass.....tons	8			....		
Other tame grasses, tons	78			55		
Prairie-grass fnc'd, tons	155,940	9,196	82,764.00	123,081	4,102	32,816.00
Totals..........	356,362	....	$2,258,005.65	313,173	....	$2,478,597.85

Corn on hand March 1, 1911. 439,355 bushels; March 1, 1912, 123,245 bushels.
Wheat on hand March 1, 1911, 94,540 bushels; March 1, 1912, 39,587 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—OTTAWA COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops........................acres	356,362	$2,258,005.65	313,173	$2,478,597.85
Animals slaughtered and sold for slaughter....	....	1,318,644.00	....	1,363,415.00
Poultry and eggs sold........................	....	115,039.00	....	108,125.00
Wool clip..........................lbs.	380	64.60	50	10.00
Cheese..............................lbs.	1,092	141.96	12	1.68
Butter..............................lbs.	216,611	51,986.64	217,747	54,436.75
Milk sold..................................	....	61,712.00	....	65,486.00
Honey and beeswax..................lbs.	4,665	716.75	2,058	309.30
Wood marketed..............................	....	170.00	....	259.00
Totals.....................................	....	$3,801,480.60	....	$4,065,640.58

LIVE STOCK.—OTTAWA COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses....................	10,310	$1,165,030.00	10,460	$1,181,980.00	111	159
Mules and asses............	2,223	291,213.00	2,418	316,758.00	7	6
Milch cows.................	7,861	314,440.00	9,783	440,235.00	44	55
Other cattle...............	25,913	699,651.00	23,146	740,672.00	189	218
Sheep......................	653	2,742.60	874	3,714.50	....	21
Swine......................	20,630	206,300.00	16,590	165,900.00	391	2,905
Totals.....................	67,590	$2,679,376.60	63,271	$2,849,259.50	742	3,364

Number of dogs in county March 1, 1911, 1763; March 1, 1912, 1764.
Number of sheep killed by dogs, year ending March 1, 1911, 3.

PAWNEE COUNTY.

Organized in 1872; area, 756 square miles; population, 8557; rank in population, 71; assessed valuation, $23,908,680; miles of railroad, main track, 62.70; county seat, Larned, population, 2810.

POPULATION AND VALUATION.—PAWNEE COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots	Personal.	Railroad, etc.	Total.
The county.......	9.015	8.557	$15,249,177	$2,408.850	$3.937,068	$2,313,585	$23,908,680
Ash Valley tp.....	210	189	$738,859	....	$114,710	$106	$853,675
Brown's Grove tp..	528	568	1,061,844	$35,215	186,390	209,491	1.492,940
Conkling tp.......	212	181	673,319	....	73,750	401	747,470
Garfield..........	. } 801	333 } 819	....	125,970	177,075	48,333	351,378
Garfield tp.......	801 }	486 }	1,543,829	....	219,275	378,583	2,136,687

POPULATION AND VALUATION.—Pawnee County.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
Grant tp.	596	558	$1,161,662	$32,080	$209,025	$197,492	$1,600,259
Keysville tp.	413	379	1,169,488	....	112,690	422	1,282,600
Larned	3,026 } 3,736	2,810 } 3,422	....	2,212,195	1,501,250	201,880	3,915,325
Larned tp.	710	612	1,394,034	370	220,240	23,011	1,637,655
Logan tp.	272	271	791,497	....	138,100	136,648	1,066,245
Morton tp.	†..........	241	765,927	2,100	108,745	595,734	1,472,506
Pawnee tp.	507	250	880,309	....	121,690	116,261	1,118,260
Pleasant Ridge tp.	279	282	999,897	920	160,650	236,456	1,397,923
Pleasant Valley tp.	503	455	1,577,514	....	199,930	50,713	1,828,157
River tp.	387	373	799,486	....	144,403	122,632	1,066,521
Valley Center tp.	276	288	833,750	....	108,620	....	942,379
Walnut tp.	295	281	857,762	....	140,525	422	998,700

* Not reported separately from township in 1911.

† A new township formed from Pawnee township since 1911.

FARM AND CROP STATISTICS.—Pawnee County.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	181,805	1,818,050	$1,545,342.50	182,500	1,642,500	$1,281,150.00
Spring wheat.......bu.	....	....	....	....	....	....
Corn.......bu.	62,290	685,190	397,410.20	56,704	1,304,192	652.096.00
Oats.......bu.	19,286	347,148	142,330.68	22,954	688,620	261,675.60
Rye.......bu.	412	4,120	3,296.00	80	1,040	728.00
Barley.......bu.	4,623	78,591	39,295.50	3,570	85,680	35,128.80
Emmer ("speltz")..bu.	660	9.240	4,158.00	113	2,260	1,039.60
Buckwheat.......bu.	....	....	....	....	....	....
Irish potatoes.......bu.	445	10,680	10,680.00	252	22,680	20,412.00
Sweet potatoes.......bu.	1	69	86.25	5	540	540.00
Castor-beans.......bu.	....	....	....	....	....	....
Cotton.......lbs.	....	....	....	....	....	....
Flax.......bu.	....	....	....	....	....	....
Tobacco.......lbs.	....	....	....	....	....	....
Broom-corn.......lbs.	....	....	....	....	....	....
Millet & hungarian, tons	360	540	3,780.00	177	442	2,431.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	....	....	....	5	350	175.00
forage or grain..tons	5,385	....	43,080.00	4,836	....	53,196.00
Milo maize.......tons	88	264	1,848.00	1,477	4,431	22,155.00
Kafir-corn.......tons	11,121	33,363	200,178.00	21,769	76,191	342,859.50
Jerusalem corn....tons	13	39	234.00	10	35	157.50
Timothy.......tons	....	* 14,074	140,740.00	....	† 15,570	132,345.00
Clover.......tons	....			15		
Blue-grass.......tons	....			....		
Alfalfa.......tons	6,956			6,386		
Orchard-grass.....tons	....			....		
Other tame grasses, tons	....			....		
Prairie-grass fnc'd, tons	102,444	3,111	27,999.00	77,953	2,769	17,998.50
Totals..........	395,889	....	$2,560,458.13	378,806	....	$2,824,087.50

Corn on hand March 1, 1911, 90,275 bushels; March 1, 1912, 53,105 bushels.
Wheat on hand March 1, 1911, 576,605 bushels; March 1, 1912, 96,895 bushels.

*** Product of 1910. † Product of 1911.**

SUMMARY.—PAWNEE COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops .... acres	395,889	$2,560,458.13	378,806	$2,824,087.50
Animals slaughtered and sold for slaughter....	....	233,615.00	....	188,878.00
Poultry and eggs sold........................	....	60,957.00	....	55,058.00
Wool clip................................lbs.	50	8.50	....	....
Cheese....................................lbs.	150	19.50	....	....
Butter....................................lbs.	152,995	36,718.80	151,620	37,905.00
Milk sold....................................	....	18,554.00	....	14,347.00
Honey and beeswax.....................lbs.	450	67.50	....	....
Wood marketed...........................	....	....	....	78.00
Totals..................................	....	$2,910,398.43	....	$3,120,353.50

LIVE STOCK.—PAWNEE COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses......................	10,428	$1,178,364 00	10,685	$1,207,405.00	277	291
Mules and asses.............	2,627	344,187 00	2,775	363,525.00	24	76
Milch cows..................	4,427	177,080.00	5,070	228,150.00	74	110
Other cattle.................	5,842	157,784.00	5,948	190,336.00	80	123
Sheep.......................	87	155.40	169	718.25	....	....
Swine.......................	7,895	78,950.00	7,023	70,230.00	384	900
Totals..................	31,256	$1.936.420.40	31,670	$2.060.364.25	839	1,500

Number of dogs in county March 1, 1911, 1257; March 1, 1912, 1245.

PHILLIPS COUNTY.

Organized in 1872; area, 900 square miles; population, 13,531; rank in population, 50; assessed valuation, $21,476,313; miles of railroad, main track, 78.20; county seat, Phillipsburg, population, 1271.

POPULATION AND VALUATION.—PHILLIPS COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......	13,983	13.531	$12,569,727	$1,759,967	$4,236,181	$2,910,438	$21,476,313
Arcade tp.........	448	432	$518,864	$4,845	$127,209	$317,285	$968,203
Beaver tp.........	407	386	411,442	....	85,735	....	497,177
Belmont tp........	521	548	507,465	26,309	148,481	178,396	860,651
Bow Creek tp.....	380	365	416,283	....	88,345	....	504,628
Crystal tp.........	440	439	514,602	....	111,964	223	626,789
Dayton tp.........	344	350	438,745	....	75,937	229	514,911
Deer Creek tp.....	402	402	666,008	....	159,755	154,430	980,193
Freedom tp.......	430	425	471,489	....	82,921	2,002	556,412

POPULATION AND VALUATION.—PHILLIPS COUNTY.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
Glenwood tp......		492		442	$375,678	....	$63,022	....	$483,700
Granite tp........		599		615	534,023	$38,425	155,835	$158,710	886,493
Greenwood tp.....		367		357	404,553	....	89,778	843	495,174
Kirwin...........	600	981	591	972	......	271,080	284,215	34,693	589,988
Kirwin tp.........	381		381		650,680	....	145,550	127,018	923,243
Logan............	735	1,040	720	1,028	....	378,875	340,125	31,868	750,868
Logan tp..........	305		308		451,131	....	79,125	126,062	656,318
Long Island......	304	853	272	830	....	131,675	183,520	....	315,195
Long Island tp....	549		558		854,578	1,260	200,210	171,627	1,227,675
Mound tp.........		443		457	561,453	18,385	207,550	336,829	1,119,217
Phillipsburg......	1,316	1,826	1,271	1,749	...	637,168	410,485	40,436	1,088,089
Phillipsburg tp....	510		478		597,889	36,500	119,152	365,505	1,119,046
Plainview tp......		262		228	389,552	....	56,319	....	445,871
Agra.............	305	834	337	820	....	106,210	147,115	40,154	298,479
Plum tp...........	529		483		659,937	....	126,520	270,159	1,056,616
Prairie View......	172	704	173	645	....	67,115	86,390	23,272	176,777
Prairie View tp...	532		472		488,365	5,605	94,875	320,826	909,671
Rushville tp.......		320		311	357,912	....	68,980	....	426,892
Solomon tp........		482		487	629,215	41,515	192,925	186,218	1,049,873
Sumner tp.........		470		383	439,781	....	79,195	102	519,078
Towanda tp.......		274		250	356,708	....	64,070	....	420,778
Valley tp.........		299		269	481,401	....	104,620	865	586,886
Walnut tp........		365		341	391,978	....	56,758	22,691	471,422

FARM AND CROP STATISTICS.—PHILLIPS COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	106,655	533,275	$453,283.75	111,697	1,228,667	$921,500.25
Spring wheat.......bu.	....	....	....	5	50	37.50
Corn...............bu.	111,976	1,007,784	624,826.08	121,866	2,924,784	1,433,144.16
Oats...............bu.	16,802	....	....	10,734	257,616	103,046.40
Rye................bu.	257	514	436.90	80	960	681.60
Barley.............bu.	1,164	3,492	1,955.52	145	1,740	783.00
Emmer ("speltz")..bu.	....	....	....	....	....	....
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	1,264	15,168	16,078.08	874	58,558	46,846.40
Sweet potatoes......bu.	....	....	....	....	....	....
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco...........lbs.	....	....	....	....	....	....
Broom-corn........lbs.	10	2,000	120.00	10	4,500	157.50
Millet & hungarian, tons	1,943	2,915	20,405.00	2,421	4,842	24,210.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	63	1,890	945.00	40	3,200	1,600.00
forage or grain..tons	7,618	....	68,562.00	8,955	....	98,505.00
Milo maize........tons	221	442	3,094.00	1,133	3,399	16,995.00
Kafir-corn........tons	5,712	17,136	107,100 00	10,494	36,729	165,280.50
Jerusalem corn....tons	46	138	863.00	....	....	....
Timothy..........tons	....	* 23,866	214,794.00	....	† 24,936	199,488.00
Clover............tons	....			....		
Blue-grass........tons	....			73		
Alfalfa...........tons	28,358			21,159		
Orchard-grass.....tons	....			....		
Other tame grasses, tons	......			4		
Prairie-grass fnc'd, tons	176,501	6,763	54,104 00	164,551	13,162	72,391.00
Totals.............	458,590	..	$1,566,567.33	454,241	....	$3,084,666.31

Corn on hand March 1. 1911. 311,797 bushels; March 1, 1912, 106,369 bushels.
Wheat on hand March 1, 1911, 82,537 bushels; March 1, 1912, 13,686 bushels.

*** Product of 1910.** **† Product of 1911.**

SUMMARY.—PHILLIPS COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops....acres	458,590	$1,566,567.33	454,241	$3,084,666.31
Animals slaughtered and sold for slaughter....	....	1,122,367.00	....	637,461.00
Poultry and eggs sold....	....	182,630.00	....	130,811.00
Wool clip....lbs.	3,108	528.36	685	137.00
Cheese....lbs.	65	8.45	....	....
Butter....lbs.	340,186	81,614.64	242,483	60,620.75
Milk sold....	....	112,200.00	....	104,346.00
Honey and beeswax....lbs.	9,273	1,415.45	1,791	268.65
Wood marketed....	....	745.00	....	291.00
Totals....	....	$3,068,106.23	....	$4,018,101.71

LIVE STOCK.—PHILLIPS COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses....	14,354	$1,622,002.00	13,882	$1,568,666.00	233	413
Mules and asses....	2,974	389,594.00	3,108	407,148.00	14	19
Milch cows....	10,033	401,320.00	10,764	484,380.00	131	338
Other cattle....	15,949	430,623.00	14,658	469,056.00	327	716
Sheep....	4,240	17,808.00	1,753	7,450.25	45	8
Swine....	39,591	395,910.00	20,897	208,970.00	454	3,952
Totals....	87,141	$3,257,257.00	65,062	$3,145,670.25	1,204	5,446

Number of dogs in county March 1, 1911, 2638; March 1, 1912, 2362.
Number of sheep killed by dogs, year ending March 1, 1911, 4.

POTTAWATOMIE COUNTY.

Organized in 1856; area, 848 square miles; population, 16,420; rank in population, 37; assessed valuation, $30,308,472; miles of railroad, main track, 106.01; county seat, Westmoreland, population, 449.

POPULATION AND VALUATION.—POTTAWATOMIE COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county....		16,635		16,420	$18,130,480	$2,302,971	$6,116,421	$3,758,600	$30,308,472
Belvue....	*....	714	189	802	$1,177,754	$62,825	$338,180	$328,867	$1,907,626
Belvue tp....	714		613						
Blue tp....		628		581	1,186,150	....	337,515	347,321	1,870,986
Olsburg....	*....	725	207	820	957,556	85,570	439,280	144,501	1,626,907
Blue Valley tp....	725		613						
Center tp....		359		338	576,905	1,285	147,985	3,014	729,189
Blaine....	*....	465	137	554	636,527	39,986	149,315	106,138	931,966
Clear Creek tp....	465		417						
Emmett tp....		481		436	538,306	51,800	163,285	139,556	892,947
Havensville....	333	896	357	824	....	108,705	129,140	....	237,845
Grant tp....	563		467		704,783	....	135,460	109,120	949,363
Green tp....		557		403	915,770	23,175	234,855	58,017	1,231,817
Lincoln tp....		336		301	517,096	....	116,130	1,379	634,605

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POPULATION AND VALUATION.—Pottawatomie County.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
Wheaton..........	202	787	226	705	$674,061	$57,615	$264,025	$245,887	$1,241,588
Lone Tree tp.......	585		479						
Louisville..........	258	873	258	873	....	49,980	37,525	....	87,505
Louisville tp.......	615		615		1,048,876	....	155,200	6,525	1,210,601
Onaga............	756	1,337	792	1,340	.....	379,940	408,580	....	788,520
Mill Creek tp.......	581		548		1,093,743	8,635	225,745	388,380	1,716,503
Pottawatomie tp..		723		750	1,175,881	6,075	399,020	4,331	1,585,307
Westmoreland....	444	844	449	837	....	130,125	206,710	....	336,835
Rock Creek tp.....	400		388		649,841	380	147,955	64,006	862,182
Fostoria..........	127	693	113	632	804,233	36,935	202,555	159,869	1,203,592
Shannon tp........	566		519						
Sherman tp........		354		366	592,970	....	103,705	3,303	699,978
Spring Creek tp...		275		243	713,681	....	146,155	1,592	861,428
St. Clere tp........		242		198	614,403	4,040	94,310	175,287	888,040
St. George.........	*....	669	259	784	585,399	32,640	169,550	389,899	1,177,488
St. George tp.......	669		525						
St. Marys..........	1,317	1,708	1,473	1,914	....	401,310	349,750	....	751,060
St. Marys tp.......	391		441		1,021,810	....	112,645	406,754	1,541,209
Union tp...........		498		471	623,799	....	124,740	5,104	753,643
Vienna tp..........		333		298	590,387	....	150,016	178,170	918,573
Wamego..........	1,647	2,138	1,465	1,950	....	811,715	485,880	....	1,297,595
Wamego tp........	491		485		730,549	10,235	141,210	491,580	1,373,574

* Not reported separately from township in 1911.

FARM AND CROP STATISTICS.—Pottawatomie County.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	10,457	230,054	$200,146.98	15,961	351,142	$294,959.28
Spring wheat.......bu.	118	2,124	1,720.44	....	....	....
Corn...............bu.	110,225	2,314,725	$1,296,246.00	97,415	2,825,085	1,610,268.95
Oats...............bu.	17,158	291,686	119,591.26	10,411	364,385	145,754.00
Rye................bu.	66	1,056	876.48	35	805	595.70
Barley.............bu.	42	1,050	525.00	....	....	....
Emmer ("speltz")..bu.	....	....	....	....	....	....
Buckwheat.........bu.	25	200	200.00	....	....	....
Irish potatoes.......bu.	1,214	33,992	31,272.64	930	107,880	70,122.00
Sweet potatoes......bu.	398	44,576	39,226.88	462	59,598	44,698.50
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	27	216	324.00
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	22	11,000	715.00	11	6,600	264.00
Millet & hungarian, tons	7,100	14,220	99,540.00	6,185	12,370	68,085.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	68	6,396	3,134.04	159	14,310	7,155.00
forage or grain..tons	576	....	6,912.00	1,920	....	28,800.00
Milo maize........tons	4	12	78.00	69	207	1,138.50
Kafir-corn........tons	8,182	12,528	75,168.00	6,901	27,604	138,020.00
Jerusalem corn....tons	33	132	792.00	7	28	140.00
Timothy..........tons	2,401	* 35,764	357,640.00	1,397	† 23,534	211,806.00
Clover............tons	495			756		
Blue-grass........tons	2,285			1,994		
Alfalfa...........tons	15,146			17,439		
Orchard-grass.....tons	389			10		
Other tame grasses, tons	247			316		
Prairie-grass fnc'd, tons	219,274	33,245	299,205.00	210,010	15,494	116,205.00
Totals.............	390,874	....	$2,532,989.72	372,415	....	$2,738,285.93

Corn on hand March 1, 1911, 839,691 bushels; March 1, 1912, 436,247 bushels.
Wheat on hand March 1, 1911, 5975 bushels; March 1, 1912, 4896 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—Pottawatomie County.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops..........acres	390,874	$2,532,989.72	372,415	$2,738,285.93
Animals slaughtered and sold for slaughter....	....	2,088,661.00	....	1,697,708.00
Poultry and eggs sold..........	....	159,184.00	....	142,778.00
Wool clip..........lbs.	1,628	276.76	1,160	232.00
Cheese..........lbs.	218	27.69	300	42.00
Butter..........lbs.	286,978	68,874.72	247,704	61,926.00
Milk sold..........	....	54,720.00	....	55,572.00
Honey and beeswax..........lbs.	5,387	820.85	3,686	559.20
Wood marketed..........	....	831.00	....	2,071.00
Totals..........	....	$4,906,385.74	....	$4,699,174.13

LIVE STOCK.—Pottawatomie County.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses..........	12,792	$1,445,496.00	11,761	$1,328,993.00	201	265
Mules and asses..........	2,442	319,902.00	2,475	324,225.00	17	20
Milch cows..........	14,025	561,000.00	17,764	799,380.00	184	113
Other cattle..........	34,426	929,502.00	32,354	1,035,328.00	508	471
Sheep..........	4,705	19,761.00	3,106	13,200.50	73	86
Swine..........	42,349	423,490.00	36,900	369,000.00	2,911	3,548
Totals..........	110,739	$3,699,151.00	104,360	$3,870,126.50	3,894	4,503

Number of dogs in county March 1, 1911, 2467; March 1, 1912, 2523.
Number of sheep killed by dogs, year ending March 1, 1911, 21; March 1, 1912, 2.

PRATT COUNTY.

Organized in 1879; area, 720 square miles; population, 10,984; rank in population, 61; assessed valuation, $25,900,209; miles of railroad, main track, 89.66; county seat, Pratt, population, 3447.

POPULATION AND VALUATION.—Pratt County.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......	10,415	10,984	$16,012,072	$2,232,489	$4,122,573	$3,533,075	$25,900,209
Banner tp.........	293	357	$945,465	$39,815	$195,160	$268,448	$1,448,888
Carmi tp.........	307	439	1,064,080	....	192,120	265,253	1,521,453
Pratt.........	3,279 } 3,615	3,447 } 3,736	....	1,837,122	1,039,535	238,152	3,114,809
Center tp.........	336 }	289 }	968,169	....	118,440	188,834	1,275,443
Elm tp.........	361	341	754,190	16,265	135,584	246,129	1,152,168
Gove tp.........	316	351	739,245	....	96,263	19,374	854,882
Grant tp.........	600	549	805,424	105,185	402,885	228,831	1,542,325
Haynesville tp....	572	894	1,346,753	95,080	369,849	437,854	2,249,486

POPULATION AND VALUATION.—PRATT COUNTY.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
Iuka tp.	650	733	$1,484,549	$52,775	$276,038	$ 108,825	$1,922,187
Lincoln tp.	426	414	905,365	....	162,463	941	1,068,769
Logan tp.	291	310	685,609	....	137,280	324,715	1,147,604
McClellan tp.	218	237	541,375	....	82,660	1,997	626,032
McPherson tp.	333	351	847,614	....	137,375	75,891	1,060,880
Naron tp.	347	362	515,979	....	105,731	158	621,868
Ninnescah tp.	264	215	784,950	....	99,252	....	884,202
Paxon tp.	480	500	948,538	23,312	150,780	235,885	1,358,515
Richland tp.	385	280	828,347	42,645	178,248	269,804	1,319.044
Saratoga tp.	149	143	333,140	14,780	36,055	170,392	554,367
Springvale tp.	295	269	604,065	545	36,000	238,323	878,933
Valley tp.	513	503	909,215	5,015	170,855	213,269	1,296,354

FARM AND CROP STATISTICS.—PRATT COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	137,855	1,378,550	$1,185,553.00	186,176	2,792,640	$2,150,832.80
Spring wheat.......bu.	....	....	....	....	....	....
Corn.............bu.	83,598	1,253,970	702,228.20	51,537	1,082,277	541,138.50
Oats.............bu.	17,035	374,770	149,908.00	19,966	459,218	174,502.84
Rye.............bu.	206	2,266	1,812.80	230	3,450	2,415.00
Barley.............bu.	3,331	53,296	26,648.00	1,179	25,938	11,153.34
Emmer ("speltz")..bu.	....	....	....	....	....	....
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	170	7,480	9,350.00	121	8,833	7,508.05
Sweet potatoes......bu.	2	150	187.50	2	118	118.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax.............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	20	8,000	560.00	....	....	....
Millet & hungarian, tons	259	518	3,367.00	326	652	3,260.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	33	1,980	990.00	20	1,400	700.00
forage or grain..tons	4,671	....	32,697.00	2,877	....	31,647.00
Milo maize........tons	626	1,252	8,764.00	742	2,226	12,248.00
Kafir-corn........tons	20,573	41,146	246,876.00	24,927	74,781	373,905.00
Jerusalem corn....tons	....	....	....	....	....	....
Timothy..........tons	....			....		
Clover............tons	....			....		
Blue-grass........tons	....			....		
Alfalfa............tons	2,889	* 1,966	19,660.00	2,631	† 1,290	11,610.00
Orchard-grass.....tons	....			....		
Other tame grasses, tons	....			....		
Prairie-grass fnc'd, tons	86,334	1,507	13,563.00	85,363	913	7,304.00
Totals.............	358,102	....	$2,402,159.50	376,097	....	$3,327,837.53

Corn on hand March 1, 1911. 181.485 bushels; March 1, 1912, 218,298 bushels.
Wheat on hand March 1, 1911, 338,869 bushels; March 1, 1912, 56,307 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—PRATT COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops .... acres	358,102	$2,402,159.50	376,097	$3,327,837.53
Animals slaughtered and sold for slaughter	....	245,325.00	....	212,357.00
Poultry and eggs sold	....	64,860.00	....	56,648.00
Wool clip .... lbs.	8,460	1,438.20	6,000	1,200.00
Cheese .... lbs.	....	....	....	....
Butter .... lbs.	195,488	46,917.12	183,541	45,885.25
Milk sold	....	18,225.00	....	14,414.00
Honey and beeswax .... lbs.	1,125	168.75	70	10.50
Wood marketed	....	200.00	....	....
Totals	....	$2,779,293.57	....	$3,658,352.28

LIVE STOCK.—PRATT COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	9,908	$1,119,604.00	9,955	$1,124,915.00	177	378
Mules and asses	3,451	452,081.00	3,671	480,901.00	18	17
Milch cows	4,910	196,400.00	5,346	240,570.00	37	112
Other cattle	6,421	173,367.00	6,648	212,576.00	91	284
Sheep	1,021	4,288.20	1,056	4,488.00	6	19
Swine	9,488	94,880.00	8,806	88,060.00	198	1,442
Totals	35,199	$2,040,620.20	35,477	$2,151,510.00	527	2,252

Number of dogs in county March 1, 1911, 1470; March 1, 1912, 1379.
Number of sheep killed by dogs, year ending March 1, 1911, 10; March 1, 1912, 10.

RAWLINS COUNTY.

Organized in 1881; area, 1080 square miles; population, 5594; rank in population, 80; assessed valuation, $7,601,567; miles of railroad, main track, 38.48; county seat, Atwood, population, 663.

POPULATION AND VALUATION.—RAWLINS COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county	6,118	5,594	$5,104,555	$324,000	$1,208,771	$964,241	$7,601,567
Achilles tp	261	228	$257,160	....	$44,085	$108	$301,353
Arbor tp	126	120	171,191	....	16,283	294	187,768
Atwood	705 } 928	663 } 873	....	$240,590	166,326	27,628	434,544
Atwood tp	223	210	311,477	....	71,963	84,253	467,693
Beaver tp	176	174	198,126	....	33,511	108	231,740
Burntwood tp	468	425	480,044	....	78,684	564	559,292
Celia tp	549	536	501,367	....	137,186	321,529	960,082
Clinton tp	286	253	334,508	....	36,513	294	371,315

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POPULATION AND VALUATION.—RAWLINS COUNTY.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
Driftwood tp	376	366	$311,228	....	$55,315	....	$366,543
Elk tp	197	178	151,508	....	27,256	....	178,764
Grant tp	109	92	163,879	....	32,530	....	196,409
Herndon	270 } 708	240 } 689	....	$83,410	112,353	$22,845	218,608
Herndon tp	438	449	275,518	....	46 447	194,438	516,403
Jefferson tp	157	107	221,745	....	26,024	510	248,279
Laing tp	278	251	176,160	....	24,931	....	201,091
Logan tp	172	145	213,857	....	27,917	146,965	388,739
Ludell tp	296	280	201,113	....	130,898	164,107	496,118
Mikesell tp	176	155	157,170	....	19,657	238	177,065
Mirage tp	199	157	309,638	....	40,440	88	350,166
Richland tp	291	250	172,937	....	25,216	....	198,153
Rotate tp	225	187	291,184	....	33,651	....	324,835
Union tp	140	128	204,745	....	21,585	277	226,607

FARM AND CROP STATISTICS.—RAWLINS COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	16,265	48,795	$41,475.75	96,307	674,149	$512,353.24
Spring wheat.......bu.	4,044	3,017	2,853.26	2,380	16,410	11,960.40
Corn...............bu.	54,729	109,458	66,769.38	43,735	743,495	356,877.60
Oats...............bu.	9,066	....	....	7,759	131,903	51,442.17
Rye................bu.	419	....	....	501	3,507	2,454.90
Barley.............bu.	26,741	....	....	12,695	253,900	104,099.00
Emmer ("speltz")..bu.	84	....	....	3	48	23.04
Buckwheat..........bu.	....	....	....	2	16	16.00
Irish potatoes.....bu.	560	3,360	3,393.60	325	18,525	14,820.00
Sweet potatoes.....bu.	....	....	....	1	70	70.00
Castor-beans.......bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn.........lbs.	162	32,400	1,620.00	250	106,250	2,656.25
Millet & hungarian, tons	1,375	1,375	11,000.00	1,427	2,854	14,270.00
Sugar-beets........tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	31	775	387.50	93	6,045	3,022.50
forage or grain..tons	20,449	....	143,143.00	10,979	....	109,790.00
Milo maize.........tons	278	278	2,224.00	2,616	5,232	26,160.00
Kafir-corn.........tons	2,593	2,593	20,744.00	5,796	17,388	69,552.00
Jerusalem corn....tons	15	15	120.00	16	48	192.00
Timothy............tons	....	* 6,805	81,660.00	....	† 6,919	51,892.50
Clover.............tons	....			....		
Blue-grass.........tons	....			....		
Alfalfa............tons	6,105			5,123		
Orchard-grass......tons	....			....		
Other tame grasses, tons	....			....		
Prairie-grass fnc'd, tons	207,473	1,038	10,380.00	221,166	1,956	11,736.00
Totals	350,389	....	$385,270.49	411,174	....	$1,343,387.60

Corn on hand March 1, 1911, 43,159 bushels; March 1, 1912, 3440 bushels.
Wheat on hand March 1, 1911, 52,419 bushels; March 1, 1912, 468 bushels.

*** Product of 1910. † Product of 1911.**

SUMMARY.—RAWLINS COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops .... acres	350,389	$385,270.49	411,174	$1,343,387.60
Animals slaughtered and sold for slaughter....	....	178,417.00	....	131,792.00
Poultry and eggs sold..........	....	56,515 00	....	37,294.00
Wool clip.......... lbs.	25,528	4,339.76	67	13.40
Cheese.......... lbs.	550	71.50	220	30.80
Butter.......... lbs.	98,217	23,572.08	78,067	19,516.75
Milk sold..........	....	17,954.00	....	13,727.00
Honey and beeswax.......... lbs.	2,301	345.15	2,810	426.50
Wood marketed..........	....	25.00	....	....
Totals..........	....	$666,509.98	....	$1,546,188.05

LIVE STOCK.—RAWLINS COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses..........	8,959	$1,012,367.00	8,686	$975,868.00	164	312
Mules and asses..........	920	120,520.00	858	112,398.00	8	4
Milch cows..........	4,384	175,360.00	4,055	182,475.00	58	156
Other cattle..........	6,856	185,112.00	4,329	138,528.00	172	201
Sheep..........	3,446	14,473.20	437	1,857.25	6	....
Swine..........	6,759	67,590.00	4,161	41,610.00	113	96
Totals..........	31,324	$1,575,422.20	22,476	$1,452,736.25	521	769

Number of dogs in county March, 1, 1911, 1826; March 1, 1912, 1122.
Number of sheep killed by dogs, year ending March 1, 1911, 1.

RENO COUNTY.

Organized in 1872; area, 1260 square miles; population, 37,482; rank in population, 7; assessed valuation, $76,690,215; miles of railroad, main track, 190.32; county seat, Hutchinson, population, 16,735.

POPULATION AND VALUATION.—RENO COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county..........	38,370	37,482	$37,997,883	$14,980,265	$15,103,870	$8,608,197	$76,690,215
Pretty Prairie..........	350 } 851	811 } 795	....	$150,924	$239,570	$24,749	$415,243
Albion tp..........	501 }	484 }	$1,110,111	....	209,050	221,270	1,540,431
Arlington..........	476 } 1,295	463 } 801	....	171,732	229,330	64,853	465,914
Arlington tp..........	819 }	338 }	863,295	....	119,950	215,683	1,198,928
Bell tp..........	378	418	933,293	....	171,000	15,072	1,119,365
Castleton tp..........	592	591	1,322,433	14,795	324,280	236,972	1,898,480
Partridge..........	265 } 726	253 } 691	....	74,096	120,060	83,338	277,494
Center tp..........	461 }	438 }	1,447,711	....	200,780	557,777	2,206,268
Clay tp..........	654	709	2,201,812	....	467,010	465,718	3,134,540

POPULATION AND VALUATION.—RENO COUNTY.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
Enterprise tp.....	419	414	$1,077,752	....	$151,210	$369	$1,229,331
Nickerson........	1,104 } 1,662	1,049 } 1,593	....	$546,305	399,570	78,754	1,024,629
Grant tp.........	558	544	1,550,506	....	273,490	654,057	2,478,053
Grove tp..........	413	430	748,993	....	104,200	130,143	983,336
Haven...........	442 } 1,420	503 } 1,599	....	312,960	260,900	24,900	598,760
Haven tp.........	978	1,096	3,183,286	....	518,420	309,953	4,011,659
Hayes tp..........	573	600	1,610,533	....	345,970	....	1,956,503
Huntsville tp......	512	481	1,118,622	....	170,190	....	1,288,812
Langdon tp.......	643	642	828,327	44,065	245,380	289,383	1,407,155
Lincoln tp........	919	1,033	2,392,190	22,065	463,130	424,307	3,301,692
Little River tp....	1,008	983	1,330,913	72,218	349,540	196,274	1,948,945
Loda tp...........	441	448	892,836	....	178,910	....	1,071,746
Medford tp........	426	401	1,040,568	....	177,480	2,790	1,220,838
Medora tp.........	413	397	681,871	13,110	98,070	422,386	1,215,437
Turon............	517 } 921	521 } 902	....	198,001	251,600	54,923	504,524
Miami tp..........	404	381	788,321	....	130,100	455,878	1,374,299
Ninnescah tp......	352	333	869,070	....	88,560	....	957,630
Plevna...........	154 } 555	164 } 514	....	42,119	93,820	....	135,939
Plevna tp.........	401	350	518,801	....	120,250	265,988	1,202,039
South Hutchinson.	436 } 1,113	440 } 1,069	....	712,574	152,250	142,326	1,007,150
Reno tp...........	677	629	1,746,181	6,322	300,150	776,955	2,829,608
Roscoe tp.........	322	340	889,184	....	128,020	....	1,017,204
Salt Creek tp......	513	678	2,024,108	....	357,200	2,285	2,383,593
Sumner tp........	400	511	1,074,032	....	92,510	352	1,166,894
Sylvia............	600 } 911	671 } 1,126	....	288,290	274,530	53,038	615,853
Sylvia tp..........	311	455	818,373	....	155,980	223,128	1,197,481
Troy tp...........	693	315	812,161	....	149,730	....	961,891
Valley tp..........	855	886	1,738,320	....	210,450	473,738	2,422,508
Walnut tp.........	540	523	1,121,198	....	226,650	1,173	1,349,021
Westminster tp....	553	529	966,082	45,277	230,700	315,210	1,557,269
Hutchinson:							
1st ward........	3,434 } 17,297	3,170 } 16,735	....	12,265,412	6,323,880	1,424,461	20,013,753
2d ward.........	3,040	2,823					
3d ward.........	2,221	2,023					
4th ward........	1,910	2,240					
5th ward........	3,005	2,531					
6th ward........	3,687	3,948					

FARM AND CROP STATISTICS.—RENO COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	189,951	2,469,368	$2,123,652.18	222,439	3,781,463	$3,100,799.66
Spring wheat.......bu.	....	....	....	....	....	....
Corn..............bu.	174,464	2,442,496	1,441,072.64	147,307	3,388,061	1,694,030.50
Oats..............bu.	44,016	836,304	334,521.60	32,235	805,875	330,408.75
Rye...............bu.	2,375	28,500	23,940.00	2,478	29,676	21,069.96
Barley.............bu.	958	14,370	7,472.40	201	5,628	2,532.60
Emmer ("speltz")..bu.	145	2,175	978.75	30	750	345.00
Buckwheat.........bu.	10	80	80.00	....	....	....
Irish potatoes.......bu.	923	13,845	17,306.25	1,490	111,750	88,282.50
Sweet potatoes......bu.	112	8,400	10,500.00	162	17,820	15,147.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco...........lbs.	....	....	....	....	....	....
Broom-corn........lbs.	2,858	1,143,200	80,024.00	3,909	2,736,300	116,292.75
Millet & hungarian, tons	650	975	6,825.00	1,071	2,945	14,725.00
Sugar-beets.......tons	....	....	....	175	1,750	8,750.00
Sorghum for—						
syrup or sugar...gals.	56	3,360	1,680.00	133	9,975	4,788.00
forage or grain..tons	6,798	....	54,384.00	8,277	....	91,047 00
Milo maize........tons	56	112	728 00	748	1,870	9,350.00
Kafir-corn........tons	8,026	24,078	144,468.00	12,817	38,451	173,029.50
Jerusalem corn....tons	80	240	1,440.00	6	18	81.00

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FARM AND CROP STATISTICS.—Reno County.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Timothy..........tons	....	* 21,015	$231,165.00	5	† 23,348	$221,806.00
Clover............tons	....			....		
Blue-grass........tons	77			51		
Alfalfa...........tons	16,449			18,093		
Orchard-grass.....tons	....			145		
Other tame grasses. tons	114			55		
Prairie-grass fnc'd, tons	134,865	15,601	140,409.00	154,220	15,411	123,288.00
Totals..............	582,983	....	$4,620,646.82	606,042	....	$6,015,773.22

Corn on hand March 1, 1911, 708,600 bushels; March 1, 1912, 565,660 bushels.
Wheat on hand March 1, 1911, 179,123 bushels; March 1, 1912, 76,882 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—Reno County.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops..............................acres	582,983	$4,620,646.82	606,042	$6,015,773.22
Animals slaughtered and sold for slaughter....	....	1,089,246.00	....	1,088,644.00
Poultry and eggs sold....................	....	232,223.00	....	178,806.00
Wool clip..............................lbs.	5,010	851.70	3,037	607.40
Cheese.................................lbs.	1,030	133.90	1,720	240.80
Butter.................................lbs.	2,099,867	599,968.08	2,502,604	706,906.88
Milk sold..............................	....	118,334.00	....	136,830.00
Honey and beeswax......................lbs.	16,741	2,520.15	7,369	1,147.35
Wood marketed..........................	....	492.00	....	1,104.00
Totals.................................	....	$6,664,415.65	....	$8,080,058.65

LIVE STOCK.—Reno County.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses......................	21,568	$2,437,184.00	20,653	$2,333,789.00	529	892
Mules and asses.............	6,056	793,336.00	6,811	892,241.00	45	67
Milch cows..................	14,600	584,000.00	16,217	729,765.00	141	260
Other cattle................	25,289	682,803.00	25,129	804,128.00	705	1,084
Sheep.......................	10,560	44,352.00	7,787	32,882.25	96	163
Swine.......................	38,534	385,340.00	29,825	298,250.00	738	12,186
Totals....................	116,607	$4,927,015.00	106,372	$5,091,055.25	2,254	14,652

Number of dogs in county March 1, 1911, 4368; March 1, 1912, 3984.
Number of sheep killed by dogs, year ending March 1, 1912, 285.

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REPUBLIC COUNTY.

Organized in 1868; area, 720 square miles; population, 16,985; rank in population, 36; assessed valuation, $36,332,399; miles of railroad, main track, 139.82; county seat, Belleville, population, 2142.

POPULATION AND VALUATION.—Republic County.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......		16,823		16,985	$21,987,225	$2,185,455	$6,511,862	$5,647,857	$36,332,399
Narka...........	258	891	244	816	....	$82,895	$131,265	$41,571	$255,731
Albon tp..........	633		572		$1,294,780	....	260,680	286,827	1,842,287
Beaver tp.........		593		581	964,010	28,055	370,092	252,913	1,615,070
Belleville tp.......		649		656	1,021,325	....	224,278	342,211	1,587,814
Republic..........	411	1,029	440	1,079	....	149,645	193,900	18,676	362,221
Big Bend tp.......	618		639		1,097,080	4,230	252,235	475,576	1,829,121
Courtland.........	390	951	413	1,035	....	164,280	173,115	68,911	406,306
Courtland tp......	561		622		1,270,140	....	230,217	510,374	2,010,731
Agenda...........	117	697	140	728	1,123,675	21,560	281,750	300,187	1,727,172
Elk Creek tp......	580		588						
Farmington tp....		583		553	980,105	1,925	172,350	81,261	1,235,641
Munden...........	249	817	221	891	....	82,855	95,055	26,450	204,360
Fairview tp.......	628		670		1,144,140	590	183,380	474,617	1,802,727
Freedom tp.......		634		627	1,238,915	....	224,065	149,890	1,612,870
Wayne...........	104	644	116	747	931,635	69,265	301,109	333,813	1,635,822
Grant tp..........	540		631						
Jefferson tp.......		644		539	1,011,425	....	146,756	230,656	1,388,846
Liberty tp.........		643		629	1,105,135	....	229,645	771	1,335,551
Talmo............	103	638	97	608	867,510	....	154,145	19,202	1,040,857
Lincoln tp........	535		511						
Norway..........	43	599	46	685	1,059,560	16,325	323,066	207,506	1,606,457
Norway tp........	556		639						
Cuba.............	482	1,086	485	1,061	....	173,645	181,205	19,226	374,076
Richland tp.......	601		576		1,140,515	....	180,105	376,248	1,696,868
Rose Creek tp.....		627		618	1,112,470	....	227,605	420,533	1,760,608
Scandia..........	592	1,183	577	1,173	....	266,960	310,642	41,515	619,117
Scandia tp........	591		596		1,181,510	....	250,272	486,422	1,918,204
Union tp..........		678		651	1,401,275	....	263,454	168,396	1,833,125
Washington tp....		622		638	1,061,520	10,400	230,588	121,623	1,424,131
White Rock tp....		528		528	980,500	2,260	196,199	3,331	1,182,290
Belleville*........		2,027		2,142	....	1,110,565	724,680	189,151	2,024,396

*** In Belleville and Freedom townships.**

FARM AND CROP STATISTICS.—Republic County.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	58,619	879,285	$747,392.25	70,677	1,272,186	$1,055,914.38
Spring wheat.......bu.	33	396	316.80	31	554	425.80
Corn...............bu.	136,010	1,768,130	990,152.80	135,032	3,645,864	1,859,390.64
Oats...............bu.	39,346	354,114	141,645.60	25,095	677,565	257,474.70
Rye................bu.	....	....	....	10	150	105.00
Barley.............bu.	15	180	93.60	....	....	....
Emmer ("speltz")..bu.	....	....	....	....	....	....
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	1,244	8,708	8,969.24	1,057	87,731	70,184.80
Sweet potatoes......bu.	....	....	....	....	....	....
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	18	7,200	468.00	4	1,800	72.00
Millet & hungarian, tons	1,407	2,111	14,777.00	1,787	3,574	19,657.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	54	3,510	1,755.00	92	5,520	2,760.00
forage or grain..tons	2,471	....	19,768.00	3,992	....	43,912.00

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FARM AND CROP STATISTICS.—Republic County.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Milo maize........tons	12	18	$126.00	32	80	$440.00
Kafir-corn........tons	310	620	3,720.00	609	1,827	9,135.00
Jerusalem corn....tons	....	....	....	10	30	150.00
Timothy..........tons	1,622	* 51,094	562,034.00	929	† 25,004	225,036.00
Clover............tons	219			101		
Blue-grass........tons	420			396		
Alfalfa...........tons	32,366			33,836		
Orchard-grass.....tons	19			9		
Other tame grasses, tons	441			219		
Prairie-grass fnc'd, tons	112,331	10,326	98,097.00	105,644	5,601	42,007.50
Totals.............	386,957	....	$2,589,315.29	379,562	....	$3,586,664.82

Corn on hand March 1, 1911, 1,498,541 bushels; March 1, 1912, 725,035 bushels.
Wheat on hand March 1, 1911, 85,630 bushels; March 1, 1912, 56,965 bushels.

*** Product of 1910. † Product of 1911.**

SUMMARY.—Republic County.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops.........................acres	**386,957**	**$2,589,315.29**	**379,562**	**$3,586,664.82**
Animals slaughtered and sold for slaughter....	....	**1,698,961.00**	....	**1,537,048.00**
Poultry and eggs sold.......................	....	**216,780.00**	....	**208,649.00**
Wool clip............................lbs.	**5,120**	**870.40**	**5,608**	**1,121.60**
Cheese...............................lbs.	....	....	**250**	**35.00**
Butter...............................lbs.	**424,644**	**109,365.00**	**510,174**	**136,336.38**
Milk sold..................................	....	**94,919.00**	....	**93,512.00**
Honey and beeswax....................lbs.	**64.811**	**9,729.15**	**8,201**	**1,230.15**
Wood marketed..............................	....	**231.00**	....	**178.00**
Totals.....................................	....	**$4.715,170.84**	....	**$5,564,774.95**

LIVE STOCK.—Republic County.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses.....................	16,122	**$1,821,786.00**	**15,144**	**$1,711,272.00**	**262**	**575**
Mules and asses............	3,117	408,827.00	**3,210**	**420,510.00**	**27**	**19**
Milch cows.................	10,149	405,960.00	**11,099**	**499,455.00**	**141**	**161**
Other cattle...............	21,267	574,209.00	**16,362**	**523,584.00**	**563**	**637**
Sheep......................	3,409	14,317.80	**2,320**	**9,860.00**	**102**	**10**
Swine......................	64,738	647,380.00	**41,694**	**416,940.00**	**2,178**	**14,351**
Totals.................	118,802	$3,871,979.80	89,829	**$3,581,621.00**	**3,273**	**15,753**

Number of dogs in county March 1, 1911, 2878; March 1, 1912, 3031.
Number of sheep killed by dogs, year ending March 1, 1911, 1.
Number of sheep killed by wolves, year ending March 1, 1911, 6.

RICE COUNTY.

Organized in 1871; area, 720 square miles; population, 14,527; rank in population, 46; assessed valuation, $34,865,455; miles of railroad, main track, 151.38; county seat, Lyons, population, 2098.

POPULATION AND VALUATION.—RICE COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county	14,263	14,527	$20,070,662	$2,698,803	$6,443,480	$5,652,510	$34,865,455
Lyons	2,054 } 2,440	2,098 } 2,478	....	$1,003,595	$836,160	$165,946	$2,005,701
Atlanta tp.	386	380	$1,147,171	....	227,140	311,993	1,686,304
Center tp.	444	461	1,162,831	....	208,090	7,563	1,373,484
Frederick	151 } 461	192 } 500	....	41,550	65,015	37,786	144,351
Eureka tp.	310	308	1,153,053	....	97,070	226,274	1,476,397
Bushton	276 } 630	280 } 656	....	102,830	168,760	21,138	292,728
Farmer tp.	354	376	1,206,857	....	224,175	244,174	1,675,206
Galt tp.	443	357	862,794	4,036	164,915	486,374	1,518,119
Harrison tp.	387	434	1,164,481	240	153,850	528,775	1,847,346
Chase	230 } 635	260 } 641	....	61,640	89,490	28,482	179,612
Lincoln tp.	405	381	1,145,078	....	216,230	227,817	1,589,125
Mitchell tp.	481	491	1,097,408	31,445	205,380	335,076	1,669,309
Pioneer tp.	427	426	1,099,910	....	166,070	245,099	1,511,079
Raymond	131 } 659	154 } 657	....	44,626	....	....	44,626
Raymond tp.	528	503	1,406,686	....	274,840	312,645	1,994,171
Rockville tp.	360	371	854,726	....	212,440	715	1,067,881
Sterling	2,091 } 2,711	2,131 } 2,764	....	896,985	1,101,425	101,277	2,099,687
Sterling tp.	620	633	1,371,574	....	246,400	820,657	2,488,631
Little River	662 } 1,488	601 } 1,472	....	252,595	303,610	34,100	590,305
Union tp.	826	871	1,892,850	10	312,550	346,644	2,552,074
Valley tp.	695	662	875,574	93,645	281,715	238,165	1,469,099
Geneseo	437 } 951	500 } 1,053	....	140,790	147,130	106,763	894,683
Victoria tp.	514	553	1,059,436	4,606	165,775	607,228	1,837,045
Washington tp.	572	625	1,424,862	1,820	279,655	103,419	1,809,256
Wilson tp.	479	479	1,145,371	18,890	320,595	114,380	1,599,236

FARM AND CROP STATISTICS.—RICE COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	106,676	1,173,436	$997,420.60	104,476	1,462,664	$1,170,131.20
Spring wheat.......bu.	....	....	....	12	144	108.00
Corn.................bu.	122,555	1,715,770	943,673.50	120,314	3,007,850	1,503,925.00
Oats.................bu.	22,669	385,873	154,149.20	24,973	674,271	276,451.11
Rye..................bu.	541	5,410	4,328.00	579	10,422	7,398.62
Barley...............bu.	291	3,201	1,600.50	128	3,328	1,431.04
Emmer ("speltz")..bu.	23	230	101.20	10	230	105.80
Buckwheat..........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	508	6,096	6,522.72	420	24,360	19,244.40
Sweet potatoes......bu.	18	1,260	1,638.00	11	1,155	1,039.50
Castor-beans........bu.	....	....	....	....	....	....
Cotton..............lbs.	....	....	....	....	....	....
Flax.................bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	2,220	888,000	62,160.00	3,395	1,527,750	68,748.75
Millet & hungarian, tons	642	963	6,741.00	739	1,478	8,129.00
Sugar-beets.......tons	....	....	....	....	....	....

FARM AND CROP STATISTICS.—RICE COUNTY.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Sorghum for—						
syrup or sugar...gals.	....	....	....	281	21,075	$10,116.00
forage or grain..tons	3,850	....	$34,650.00	4,571	....	54,852.(0
Milo maize........tons	11	22	165.00	285	705	3,525.00
Kafir-corn........tons	5,451	13,628	95,396.00	10,878	41,492	165,968.00
Jerusalem corn....tons	82	205	1,435.00	6	24	96.00
Timothy..........tons	18	* 22,363	223,630.00	....	† 21,593	194,337.00
Clover............tons	....			....		
Blue-grass........tons	....			....		
Alfalfa...........tons	17,549			18,276		
Orchard-grass.....tons	....			....		
Other tame grasses, tons	77			56		
Prairie-grass fnc'd, tons	98,482	10,931	98,879.00	95,958	4,920	36,900.00
Totals.............	381,658	....	$2,631,989.72	384 813	....	$3,522,506.42

Corn on hand March 1, 1911, 618,440 bushels; March 1, 1912, 284,939 bushels.
Wheat on hand March 1, 1911, 174,203 bushels; March 1, 1912, 52,017 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—RICE COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops...........................acres	381,658	$2,631,989.72	384,813	$3,522,506.42
Animals slaughtered and sold for slaughter....	....	1,074,983.00	....	1,006,898.00
Poultry and eggs sold....................	....	128,998.00	....	107,434.00
Wool clip..............................lbs.	132	22.44	70	14.00
Cheese.................................lbs.	....	....	....	....
Butter.................................lbs.	271,988	65,277.12	268,514	67,128.50
Milk sold................................	....	41,501.00	....	45,649.00
Honey and beeswax......................lbs.	17,767	2,668.05	5,427	815.05
Wood marketed............................	....	30.00	....	85.00
Totals.................................	....	$3,945,469.33	....	$4,750,529.97

LIVE STOCK.—RICE COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses......................	11,920	$1,346,960.00	11,826	$1,336,288.00	338	490
Mules and asses.............	3,526	461,906.00	3,591	470,421.00	26	34
Milch cows..................	7,476	299,040.00	8,437	379,665.00	94	132
Other cattle................	16,829	454,383.00	15,951	510,482.00	474	449
Sheep.......................	120	504.00	2,532	10,761.00	....	21
Swine.......................	27,496	274,960.00	26,897	268,970.00	765	4,423
Totals..................	67,367	$2,837,753.00	69,234	$2,976,587.00	1,697	5,549

Number of dogs in county March 1, 1911, 1946; March 1, 1912, 1894.
Number of sheep killed by dogs, year ending March 1, 1911, 2; March 1, 1912, 2.

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RILEY COUNTY.

Organized in 1855; area, 617 square miles; population, 15,792; rank in population, 41; assessed valuation, $28,566,463; miles of railroad, main track, 100.04; county seat, Manhattan, population, 6453.

POPULATION AND VALUATION.—RILEY COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......	15,671	15,792	$13,125,220	$4,975,865	$6,183,080	$4,282,298	$28,566,463
Ashland tp........	258	267	$771,165	....	$117,285	....	$888,450
Leonardville......	357 } 1,028	346 } 1,000	....	$143,410	163,175	$2,304	308,889
Bala tp...........	671	654	1,155,495	11,875	244,875	236,016	1,647,761
Center tp.........	366	368	558,640	....	227,135	935	786,710
Fancy Creek tp....	424	418	677,170	1,905	192,865	57,825	929,765
Grant tp..........	478	448	624,445	13,995	176,735	229,602	1,044,777
Randolph.........	405 } 835	391 } 842	....	176,600	277,750	798	455,148
Jackson tp........	430	451	667,905	15,870	221,405	194,166	1,099,346
Riley.............	231 } 993	345 } 1,073	....	106,500	151,405	21,633	279,538
Madison tp........	762	728	1,478,930	8,510	281,295	398,247	2,166,982
Manhattan........	6,221 } 7,368	6,453 } 7,581	....	4,312,870	2,254,155	418,305	6,984,830
Manhattan tp.....	1,147	1,128	1,743,190	55,690	375,195	824,145	2,998,220
May Day tp.......	454	462	600,630	....	195,745	1,161	797,536
Ogden...........	237 } 1,015	258 } 942	....	46,755	29,780	1,351	77,886
Ogden tp.........	778	684	1,272,250	....	241,440	461,354	1,975,044
Sherman tp.......	465	444	547,990	....	149,960	349,893	1,047,843
Swede Creek tp....	750	726	869,760	59,940	432,860	284,428	1,646,988
Wild Cat tp.......	636	626	825,350	22,945	178,785	500,532	1,527,612
Zeandale tp.......	601	595	1,332,300	....	271,285	299,608	1,903,143

FARM AND CROP STATISTICS.—RILEY COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	12,872	244,568	$210,328.48	14,239	256,302	$212,730.66
Spring wheat.......bu.	13	195	156.00	103	1,741	1,433.83
Corn...............bu.	74,717	1,494,340	867,717.20	74,364	1,933,464	1,082,739.84
Oats...............bu.	17,566	333,754	126,826.52	13,050	378,450	151,380.00
Rye................bu.	93	1,488	1,264.80	144	2,880	2,160.00
Barley.............bu.	45	900	495.00	....	....	....
Emmer ("speltz")..bu.	....	....	....	5	120	54.00
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes......bu.	998	19,960	19,960.00	667	62,031	43,421.70
Sweet potatoes......bu.	52	3,482	3,760.56	99	9,900	7,920.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	1	500	32.50	36	19,800	792.00
Millet & hungarian, tons	3,070	6,140	39,910.00	2,105	3,157	15,785.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	50	4,000	2,000.00	29	2,175	1,087.50
forage or grain..tons	1,988	....	19,880.00	2,525	....	35,350.00
Milo maize........tons	38	76	456.00	34	119	595.00
Kafir-corn........tons	2,665	7,995	43,973.00	4,846	19,384	87,228.00
Jerusalem corn....tons	11	33	182.00	1	4	18.00

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FARM AND CROP STATISTICS.—RILEY COUNTY.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Timothy..........tons	9	* 30,479	$335,269.00	2	† 18,362	$183,620.00
Clover............tons	5			8		
Blue-grass........tons	304			273		
Alfalfa...........tons	16,734			15,855		
Orchard-grass.....tons	5			1		
Other tame grasses, tons	26			26		
Prairie-grass fnc'd, tons	160,863	18,198	181,980.00	146,924	8,091	68,773.50
Totals.............	292,125	....	$1,854,191.06	275,336	....	$1,895,089.03

Corn on hand March 1, 1911, 554,535 bushels; March 1, 1912, 238,309 bushels.
Wheat on hand March 1, 1911, 20,332 bushels; March 1, 1912, 11,272 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—RILEY COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops.............................acres	292,125	$1,854,191.06	275,336	$1,895,089.03
Animals slaughtered and sold for slaughter....	....	1,838,416.00	....	1,466,069.00
Poultry and eggs sold........................	....	146,941.00	....	122,683.00
Wool clip..................................lbs.	....	....	510	102.00
Cheese.....................................lbs.	131	17.03	264	36.96
Butter.....................................lbs.	290,507	69,721.68	232,761	58,190.25
Milk sold....................................	....	40,563.00	....	54,411.00
Honey and beeswax..........................lbs.	11,315	1,720.15	5,192	800.80
Wood marketed................................	....	3,528.00	....	2,912.00
Totals.......................................	....	$3,955,097.92	....	$3,600,294.04

LIVE STOCK.—RILEY COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses......................	8,589	$970,557.00	8,269	$934,397.00	72	178
Mules and asses.............	1,684	220,604.00	1,821	238,551.00	5	7
Milch cows..................	10,573	422,920.00	12,043	541,935.00	51	56
Other cattle................	28,218	761,886.00	24,447	782,804.00	225	346
Sheep.......................	2,590	10,878.00	1,286	5,465.50	....	20
Swine.......................	38,270	382,700.00	26,566	265,660.00	2,427	3,355
Totals......................	89,924	$2,769,545.00	74,432	$2,768,312.50	2,780	3,962

Number of dogs in county March 1, 1911, 1850; March 1, 1912, 2109.
Number of sheep killed by dogs, year ending March 1, 1912, 15.
Number of sheep killed by wolves, year ending March 1, 1912, 3.

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ROOKS COUNTY.

Organized in 1872; area, 900 square miles; population, 10,465; rank in population, 63; assessed valuation, $19,032,901; miles of railroad, main track, 48.99; county seat, Stockton, population, 1402.

POPULATION AND VALUATION.—ROOKS COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......	10,961	10,465	$12,624,880	$1,518,740	$3,499,390	$1,389,891	$19,032,901
Alcona tp.........	301	184	$416,950	....	$58,165	$318	$475,433
Ash Rock tp.......	339	329	571,880	....	136,595	556	709,031
Belmont tp........	620	580	566,110	$36,015	121,940	3,363	727,428
Bow Creek tp.....	283	230	408,135	....	76,275	....	484,410
Corning tp........	274	249	485,250	....	83,480	1,317	570,047
Farmington tp....	289	277	533,200	....	76,125	....	609,325
Greenfield tp......	202	205	428,500	....	43,995	....	472,495
Hobart tp.........	177	181	428,100	....	56,675	....	484,775
Iowa tp...........	291	260	457,785	....	105,915	152,589	716,289
Lanark tp.........	252	252	501,375	....	79,365	226	580,966
Logan tp.........	506	648	582,610	34,285	150,420	164,722	932,037
Woodston........	312 } 640	305 } 642	....	105,650	189,025	20,134	314,809
Lowell tp.........	328	337	464,860	....	101,035	138,240	704,135
Medicine tp.......	266	279	471,900	....	82,910	611	555,421
Palco............	372 } 654	305 } 580	....	115,035	151,700	25,676	292,411
Northampton tp...	282	275	592,530	....	81,345	204,833	878.708
Paradise tp.......	682	503	860,025	30,810	217,900	375,916	1,484,651
Plainville.........	1,080 } 1,700	884 } 1,504	....	510,890	407,745	48,722	967,357
Plainville tp......	620	620	1,402,100	....	166,590	159,423	1,728,113
Richland tp.......	495	498	481,300	27,055	130,680	70,239	709,274
Rush tp..........	239	248	495,700	....	66,125	....	561,825
Stockton tp.......	331	304	523,350	....	96,410	266	620,026
Sugar Loaf tp.....	279	290	458,920	....	82,725	....	541,645
Twin Mound tp....	364	330	540,200	....	65,965	1,802	607,967
Walton tp........	498	490	954,100	....	97,725	....	1,051,825
Stockton*........	1,279	1,402	....	659,000	572,560	20,938	1,252,498

* In Iowa and Stockton townships.

FARM AND CROP STATISTICS.—ROOKS COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	129,885	519,540	$441,609.00	172,538	2,760,608	$2,098,062.08
Spring wheat.......bu.	25	....	....	16	224	161.28
Corn...............bu.	78,172	156,344	96,933.28	61,463	1,536,575	737,556.00
Oats...............bu.	14,941	29,882	14,343.36	7,024	252,864	101,145.60
Rye................bu.	35	....	....	24	288	201.60
Barley.............bu.	102	....	....	148	2,960	1,272.80
Emmer ("speltz")..bu.	25	....	....	....	....	....
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	774	....	....	519	40,482	32,385.60
Sweet potatoes......bu.	....	....	....	1	88	99.44
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	1	200	11.00	....	....	....
Millet & hungarian, tons	1,166	1,749	12,243.00	931	2,094	10,470.00
Sugar-beets.......tons	....	....	....	1	8	40.00
Sorghum for—						
syrup or sugar...gals.	....	....	....	10	750	375.00
forage or grain..tons	6,860	....	48,020.00	5,433	....	54,330.00

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FARM AND CROP STATISTICS.—ROOKS COUNTY.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Milo maize........tons	42	84	$588.00	296	888	$3,996.00
Kafir-corn........tons	10,789	26,973	161,838.00	12,792	44,772	179,088.00
Jerusalem corn....tons	15	38	228.00	20	70	280.00
Timothy..........tons	5	* 14,789	147,890.00	....	† 11,090	83,175.00
Clover...........tons	....			....		
Blue-grass........tons	6			....		
Alfalfa...........tons	14,329			12,768		
Orchard-grass.....tons	....			....		
Other tame grasses, tons	15			1		
Prairie-grass fnc'd, tons	168,654	4,713	37,704.00	161,481	5,228	28,754.00
Totals............	425,841	....	$961,407.64	435,461	....	$3,331,392.40

Corn on hand March 1, 1911, 169,858 bushels; March 1, 1912, 16,337 bushels.
Wheat on hand March 1, 1911, 164,463 bushels; March 1, 1912, 28,499 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—ROOKS COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops..........................acres	425,841	$961,407.64	435,461	$3,331,392.40
Animals slaughtered and sold for slaughter....	....	645,389.00	....	393,896.00
Poultry and eggs sold....................	....	125,356.00	....	86,032.00
Wool clip..........................lbs.	....	....	100	20.00
Cheese.............................lbs.	....	....	....	....
Butter.............................lbs.	199,834	47,960.16	159,755	39,938.75
Milk sold..............................	....	72,783.00	....	74,484.00
Honey and beeswax..................lbs.	3,726	560.00	1,395	209.25
Wood marketed..........................	....	425.00	....	525.00
Totals................................	....	$1,858,830.80	....	$3,926,497.40

LIVE STOCK.—ROOKS COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses......................	11,955	$1,350,915.00	11,511	$1,300,743.00	106	365
Mules and asses.............	2,714	355,534.00	2,466	323,046.00	5	20
Milch cows..................	8,539	341,560.00	8,909	400,905.00	63	203
Other cattle................	17,322	467,694.00	12,591	402,912.00	181	362
Sheep.......................	5,461	22,936.20	1,333	5,665.25	76	....
Swine.......................	19,937	199,370.00	11,810	118,100.00	205	586
Totals..................	65,928	$2,788,009.20	48,620	$2,551,371.25	636	1,536

Number of dogs in county March 1, 1911, 1930; March 1, 1912, 1764.

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RUSH COUNTY.

Organized in 1874; area, 720 square miles; population, 7774; rank in population, 73; assessed valuation, $15,948,943; miles of railroad, main track, 62.20; county seat, La Crosse, population, 755.

POPULATION AND VALUATION.—RUSH COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county	7,672	7,774	$10,337,509	$770,171	$2,572,478	$2,268,785	$15,948,943
Alexander tp	251	250	$480,812	....	$65,210	$188,489	$734,511
Banner tp	408	382	772,855	....	168,190	196,817	1,132,362
Belle Prairie tp	408	467	455,131	$6,330	121,470	203,639	786,570
Big Timber tp	583	579	766,918	13,100	88,570	95	868,678
Brookdale tp	258	233	528,068	....	52,890	242,833	818,291
Rush Center	222 } 580	227 } 588	706,297	39,545	178,120	199,027	1,117,989
Center tp	358	361					
Fairview tp	315	384	593,571	....	67,980	824	662,375
Garfield tp	408	430	1,037,362	....	188,490	198,155	1,424,007
McCracken	419 } 740	425 } 755	....	127,687	179,713	55,088	362,488
Hampton tp	321	330	488,065	....	78,150	20,611	586,826
Illinois tp	431	478	760,950	....	84,680	47	845,677
La Crosse	798 } 1,128	755 } 1,061	....	378,295	390,750	52,354	821,399
La Crosse tp	330	306	716,888	....	99,970	202,054	1,018,912
Bison	251 } 700	292 } 689	....	129,409	188,680	46,745	364,834
Lone Star tp	449	397	785,792	....	147,620	195,140	1,128,552
Otis	220 } 699	218 } 713	....	75,805	124,890	1,566	202,261
Pioneer tp	479	495	804,525	....	180,140	269,970	1,204,635
Pleasantdale tp	422	411	857,568	....	118,085	202	975,805
Union tp	341	354	587,712	....	109,430	195,629	892,771

FARM AND CROP STATISTICS.—RUSH COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	84,676	508,056	$447,089.28	160,763	1,607,630	$1,221,798.80
Spring wheat.......bu.	165	....	....	9	81	61.56
Corn.......bu.	48,118	192,472	117,427.92	38,708	696,744	397,144.08
Oats.......bu.	23,448	234,480	93,792.00	18,869	566,070	220,767.30
Rye.......bu.	....	....	....	15	180	126.00
Barley.......bu.	7,790	93,480	46,740.00	1,288	33,488	14,734.72
Emmer ("speltz")..bu.	494	2,470	1,136.20	49	980	450.80
Buckwheat.......bu.	....	....	....	....	....	....
Irish potatoes.......bu.	312	6,240	6,240.00	258	15,996	13,756.56
Sweet potatoes.......bu.	....	....	....	....	....	....
Castor-beans.......bu.	....	....	....	....	....	....
Cotton.......lbs.	....	....	....	....	....	....
Flax.......bu.	....	....	....	....	....	....
Tobacco.......lbs.	....	....	....	....	....	....
Broom-corn.......lbs.	....	....	....	675	303,750	9,112.50
Millet & hungarian, tons	1,280	1,280	8,960.00	749	1,498	7,490.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	7	210	105.00	17	1,190	595.00
forage or grain..tons	9,527	....	66,689.00	9,369	....	103,059.00
Milo maize.......tons	40	60	420.00	1,210	3,025	16,637.50
Kafir-corn.......tons	9,648	19,296	115,776.00	14,156	42,468	212,340.00
Jerusalem corn....tons	....	....	....	20	60	300.00

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FARM AND CROP STATISTICS.—RUSH COUNTY.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Timothy..........tons	....	* 7,959	$87,549.00	....	† 4,600	$39,100.00
Clover............tons	....			....		
Blue-grass........tons	....			....		
Alfalfa...........tons	2,304			2,571		
Orchard-grass.....tons	....			....		
Other tame grasses, tons	6			....		
Prairie-grass fac'd, tons	136,615	4,437	39,933.00	125,554	4,170	27,105.00
Totals.............	324,430	....	$1,031,857.40	374,280	....	$2,284,578.82

Corn on hand March 1, 1911, 71,780 bushels; March 1, 1912, 6708 bushels.
Wheat on hand March 1, 1911, 459,736 bushels; March 1, 1912, 43,360 bushels.
* Product of 1910. † Product of 1911.

SUMMARY.—RUSH COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops..........................acres	324,430	$1,031,857.40	374,280	$2,284,578.82
Animals slaughtered and sold for slaughter....	....	168,720.00	....	95,518.00
Poultry and eggs sold..........	....	81,827.00	....	66,667 00
Wool clip..........lbs.	....	....	25	5.00
Cheese..........lbs.	745	96.85	955	133.70
Butter..........lbs.	90,548	21,731 52	81,415	20,353.75
Milk sold..........	....	49,244.00	....	48,006.00
Honey and beeswax..........lbs.	30	4.50	30	4.50
Wood marketed..........	....	....	....	22.00
Totals..........	....	$1,353,481.27	....	$2,515,288.77

LIVE STOCK.—RUSH COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses..........	10,794	$1,219,722.00	10,689	$1,207,857.00	281	402
Mules and asses..........	1,334	174,754.00	1,450	189,950.00	19	15
Milch cows..........	5,935	237,400.00	6,038	271,710.00	120	156
Other cattle..........	8,964	242,028.00	7,256	232,192.00	367	501
Sheep..........	118	495.60	153	650.25	....	8
Swine..........	5,149	51,490.00	3,592	35,920.00	174	358
Totals..........	32,294	$1,925,889.60	29,178	$1,938,279 25	961	1,440

Number of dogs in county March 1, 1911, 1803; March 1, 1912, 1675.
Number of sheep killed by dogs, year ending March 1, 1912, 2.

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RUSSELL COUNTY.

Organized in 1872; area, 900 square miles; population, 11,034; rank in population, 60; assessed valuation, $24,660,006; miles of railroad, main track, 59.94; county seat, Russell, population, 1618.

POPULATION AND VALUATION.—Russell County.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......		11,160		11,034	$15,471,540	$1,866,268	$4,937,365	$2,384,833	$24,660,006
Gorham..........	120	904	123	804	$1,407,789	$40,425	$544,690	$301,123	$2,294,027
Big Creek tp......	784		681		....	....	....	....	....
Bunkerhill........	235	1,345	242	1,410	....	90,135	144,560	76,250	310,945
Center tp.........	1,110		1,168		2,550,013	....	411,165	386,398	3,347,576
Fairfield tp.......		304		289	676,973	....	86,645	307	763,925
Lucas............	654	1,082	613	1,155	....	313,260	322,620	32,868	668,748
Fairview tp.......	428		542		1,295,890	....	226,755	171,033	1,693,678
Grant tp..........		557		560	1,270,990	....	165,940	107,840	1,544,770
Lincoln tp........		461		495	739,011	....	178,385	919	918,315
Luray............	303	901	368	892	....	122,745	175,128	18,536	316,409
Luray tp..........	598		524		1,140,903	605	174,660	170,881	1,487,049
Fairport..........	* .	990	36	1,139	1.799,065	65,992	400,010	228,856	2,493,923
Ivimar...........	*....		178						
Paradise tp.......	990		925						
Dorrance.........	294	1,136	226	1,049	....	128,945	162,025	42,535	333,505
Plymouth tp......	842		823		2,127,067	....	320,612	278,424	2,726,103
Russell...........	1,966	2,189	1,618	1,891	....	1,043,746	1,132,420	81,348	2,257,514
Russell tp.........	223		272		825,906	....	84,320	273,380	1,183,606
Waldo...........	204	1,000	213	1,042	....	60,415	96,145	29,557	186,117
Waldo tp.........	796		829		1,013,654	....	193,965	184,115	1,391,734
Winterset tp......		291		308	624,279	....	117,320	463	742,062

* Not reported separately from township in 1911.

FARM AND CROP STATISTICS.—Russell County.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	92,467	369,868	$318,086.48	159,925	2,398,875	$1,871,122.50
Spring wheat.......bu.	50	....	....	....	....	....
Corn...............bu.	57,694	115,388	76,156.08	39,639	792,780	436,029.00
Oats...............bu.	11,559	34,677	15,951.42	10,325	289,100	127,204.00
Rye................bu.	30	....	....	254	3,556	2,489.20
Barley.............bu.	186	....	....	120	3,000	1,290.00
Emmer ("speltz")..bu.	21	....	....	4	84	40.32
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	515	....	....	354	29,382	23,799.42
Sweet potatoes.....bu.	....	....	....	....	....	....
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco...........lbs.	....	....	....	....	....	....
Broom-corn........lbs.	....	....	....	5	2,500	87.50
Millet & hungarian, tons	165	83	664.00	186	418	2,194.50
Sugar-beets.......tons	....	....	....	1	9	45.00
Sorghum for—						
syrup or sugar...gals.	....	....	....	....	....	....
forage or grain..tons	7,623	....	38,115.00	6,621	....	72,831.00
Milo maize........tons	2,715	4,073	28,511.00	246	615	3,075.00
Kafir-corn........tons	13,243	13,243	92,701.00	14,496	43,488	195,696.00
Jerusalem corn....tons	....	....	....	....	....	....

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FARM AND CROP STATISTICS.—RUSSELL COUNTY.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Timothy..........tons	....	* 7,934	$87,274.00	....	† 8,544	$30,124.00
Clover............tons	....			....		
Blue-grass........tons	....			....		
Alfalfa...........tons	7,559			6,295		
Orchard-grass.....tons	....			....		
Other tame grasses, tons	6			10		
Prairie-grass fnc'd, tons	234,357	5,722	51,498.00	205,955	2,081	13,201.50
Totals.............	428,190	....	$708,956.98	444,436	....	$2,779,228.94

Corn on hand March 1, 1911, 293,061 bushels; March 1, 1912, 23,611 bushels.
Wheat on hand March 1, 1911, 529,969 bushels; March 1, 1912, 87,352 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—RUSSELL COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops.............................acres	428,190	$708,956.98	444,436	$2,779,228.94
Animals slaughtered and sold for slaughter....	....	394,816.00	....	279,398.00
Poultry and eggs sold..........................	....	102,730.00	....	83,681.00
Wool clip..................................lbs.	5,600	952.00	5,100	1,020.00
Cheese.....................................lbs.	....	....	....	....
Butter.....................................lbs.	163,715	39,291.60	156,725	39,181.25
Milk sold......................................	....	54,510.00	....	46,469.00
Honey and beeswax........................lbs.	1,042	156.80	1,460	220.00
Wood marketed..................................	....	....	....	90.00
Totals...	....	$1,301,412.88	....	$3,229,288.19

LIVE STOCK.—RUSSELL COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses......................	13,033	$1,472,729.00	13,029	$1,472,277.00	344	440
Mules and asses.............	1,562	204,622.00	1,539	201,609.00	24	22
Milch cows..................	11,374	454,960.00	10,839	487,755.00	168	249
Other cattle................	19,591	528,957.00	14,311	457,952.00	476	591
Sheep.......................	734	3,082.80	899	1,695.75	7	427
Swine.......................	14,380	143,800.00	10,170	101,700.00	248	664
Totals.................	60,674	$2,808,150.80	50,287	$2,722,988.75	1,267	2,393

Number of dogs in county March 1, 1911, 1866; March 1, 1912, 1907.
Number of sheep killed by dogs, year ending March 1, 1911, 1.

SALINE COUNTY.

Organized in 1859; area, 720 square miles; population, 20,672; rank in population, 24; assessed valuation, $41,665,834; miles of railroad, main track, 147.15; county seat, Salina, population, 10,096.

POPULATION AND VALUATION.—Saline County.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county	20,095	20,672	$16,975,150	$8,655,777	$9,420,989	$6,618,918	$41,665,834
Cambria tp.	577	579	$963,170	$38,310	$199,170	$441,931	$1,642,581
Dayton tp.	411	439	1,385,885	....	185,610	947,681	2,519,176
Elm Creek tp.	484	487	1,149,060	....	232,750	178,772	1,560,582
Eureka tp.	406	403	898,640	10,825	178,175	356,248	1,443,858
Falun tp.	564	557	690,275	43,130	228,820	290,186	1,252,411
Glendale tp.	306	326	443,000	....	110,846	1,514	554,860
Greeley tp.	544	546	849,760	19,385	177,430	651,785	1,698,310
Gypsum	586 } 1,077	663 } 1,187	....	255,392	230,895	45,995	532,282
Gypsum tp.	491	524	838,460	....	196,352	170,250	1,205,062
Liberty tp.	360	347	678,545	....	140,200	280,515	1,099,260
Ohio tp.	524	533	814,915	9,495	205,612	335,697	1,365,719
Pleasant Valley tp.	401	436	615,490	....	118,872	80,984	815,346
Salina	9,798 } 10,433	10,096 } 10,784	....	8,040,175	5,364,459	881,558	14,286,192
Smoky Hill tp.	635	688	1,671,335	40,680	352,195	460,056	2,524,266
Assaria	258 } 1,029	268 } 1,072	....	85,880	130,815	162	216,857
Smoky View tp.	771	804	1,093,990	20,595	260,780	318,676	1,694,041
Smolan tp.	642	651	1,262,510	28,230	265,401	420,240	1,976,381
Solomon tp.	448	464	933,040	5,700	173,415	81,092	1,193,247
Brookville	265 } 742	263 } 765	....	57,980	70,395	2,605	130,980
Spring Creek tp.	477	502	819,740	....	221,650	421,627	1,463,017
Summit tp.	190	181	351,045	....	33,780	1,194	386,019
Walnut tp.	528	507	855,555	....	162,207	1,815	1,019,577
Washington tp.	434	408	660,785	....	181,660	243,385	1,085,780

FARM AND CROP STATISTICS.—Saline County.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value
Winter wheat.......bu.	102,766	1,335,958	$1,135,564.30	112,725	1,690,875	$1,352,700.00
Spring wheat.......bu.	213	2,130	1,649.00	80	1,120	896.00
Corn...............bu.	77,531	1,395,558	767,556.90	65,099	1,432,178	830,663.24
Oats...............bu.	12,032	216,576	86,630.40	7,984	199,600	81,836.00
Rye................bu.	142	2,272	1,931.20	349	4,537	3,312.01
Barley.............bu.	657	11,826	6,149.52	80	2,000	860.00
Emmer ("speltz")..bu.	12	168	75.60	5	115	54.05
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	772	12,352	13,957.76	576	48,384	36,288.00
Sweet potatoes......bu.	....	....	....	4	400	400.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	....	....	....	....	....	....
Millet & hungarian, tons	368	736	5,152.00	243	364	1,820.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	78	5,070	2,433.60	76	5,320	2,553.60
forage or grain..tons	5,800	....	52,200.00	6,786	....	67,860.00
Milo maize........tons	5	13	91.00	26	65	325.00
Kafir-corn........tons	5,709	19,989	119,892.00	8,950	26,850	120,825.00
Jerusalem corn....tons	....	....	....	2	6	27.00

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FARM AND CROP STATISTICS.—SALINE COUNTY.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Timothy..........tons	....	* 32,819	$328,190.00	....	† 26,465	$264,650.00
Clover............tons	....			....		
Blue-grass........tons	77			10		
Alfalfa...........tons	18,679			19,448		
Orchard-grass.....tons	8			....		
Other tame grasses, tons	6			25		
Prairie-grass fnc'd, tons	113,044	12,073	120,730.00	127,604	7,702	65,467.00
Totals.............	337,899	....	$2,642,203.28	350,072	....	$2,830,536.90

Corn on hand March 1, 1911, 469,560 bushels; March 1, 1912, 140,366 bushels.
Wheat on hand March 1, 1911, 114,090 bushels; March 1, 1912, 40,127 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—SALINE COUNTY.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops............................acres	337,899	$2,642,203.28	350,072	$2,830,536.90
Animals slaughtered and sold for slaughter....	....	1,298,155.00	....	1,272,827.00
Poultry and eggs sold........................	....	143,284.00	....	135,574.00
Wool clip.................................lbs.	....	....	60	12.00
Cheese....................................lbs.	535	69.55	594	83.16
Butter....................................lbs.	1,132,788	325,944.96	942,622	263,499.26
Milk sold..................................	....	82,469.00	....	78,260.00
Honey and beeswax.........................lbs.	11,153	1,682.55	7,802	1,248.80
Wood marketed..............................	....	....	....	30.00
Totals.....................................	....	$4,493,808.34	....	$4,582,071.12

LIVE STOCK.—SALINE COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses......................	11,564	$1,306,782.00	11,416	$1,290,008.00	188	215
Mules and asses.............	2,041	267,371.00	2,246	294,226.00	13	8
Milch cows..................	9,142	365,680.00	11,264	506,880.80	64	98
Other cattle................	28,623	772,821.00	26,904	860,928.00	259	345
Sheep.......................	1,281	5,380.20	1,047	4,449.75	4	53
Swine.......................	23,645	236,456.00	15,951	159,510.00	560	11,198
Totals..................	76,296	$2,954,434.20	68,828	$3,116,001.75	1,088	11,817

Number of dogs in county March 1, 1911, 2143; March 1, 1912, 1809.
Number of sheep killed by dogs, year ending March 1, 1012, 14.

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SCOTT COUNTY.

Organized in 1886; area, 720 square miles; population, 2482; rank in population, 95; assessed valuation, $5,800,735; miles of railroad, main track, 68.01; county seat, Scott, population, 865.

POPULATION AND VALUATION.—Scott County.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......	2,765	2,482	$3,129,125	$277,280	$700,775	$1,693,555	$5,800,735
Beaver tp.........	268	196	$407,570	$3,840	$47,805	$85,824	$545,039
Isbel tp...........	232	190	336,350	3,175	62,190	315,131	716,846
Keystone tp.......	273	249	359,185	2,895	80,295	515,942	958,267
Lake tp...........	259	214	448,855	....	64,870	....	513,725
Michigan tp.......	386	329	444,025	1,265	60,440	95,650	601,380
Scott.............	836 } 1,095	865 } 1,086	....	265,620	271,820	109,487	646,877
Scott tp..........	259	221	622,725	....	67,115	482,318	1,172,158
Valley tp.........	252	218	510,465	485	46,240	89,253	646,443

FARM AND CROP STATISTICS.—Scott County.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	1,748	6,992	$6,152.96	3,538	14,152	$10,614.00
Spring wheat.......bu.	567	....	....	102	510	357.00
Corn...............bu.	13,698	13,698	8,492.76	5,658	79,212	47,527.20
Oats...............bu.	5,687	....	....	3,960	55,440	22,176.00
Rye................bu.	36	....	....	250	2,250	1,597.50
Barley.............bu.	3,243	12,972	7,134.60	1,875	22,500	9,450.00
Emmer ("speltz")..bu.	106	....	....	25	275	137.50
Buckwheat..........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	86	344	419.68	79	3,555	3,199.50
Sweet potatoes......bu.	3	75	90.00	1	75	75.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	562	112,400	6,182.00	278	111,200	2,780.00
Millet & hungarian, tons	3,466	1,733	13,864.00	2,355	3,532	17,660.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	10	200	100.00	20	1,100	550.00
forage or grain..tons	27,266	....	163,596.00	24,872	....	198,976.00
Milo maize........tons	7,506	11,259	90,072.00	4,707	9,414	47,070.00
Kafir-corn........tons	4,041	4,041	32,328.00	3,802	7,604	38,020.00
Jerusalem corn....tons	5	5	40.00	45	90	450.00
Timothy..........tons	....	* 2,209	26,508.00	....	† 1,355	11,517.50
Clover............tons	....			....		
Blue-grass........tons	....			....		
Alfalfa...........tons	1,720			985		
Orchard-grass.....tons	....			....		
Other tame grasses, tons	....			20		
Prairie-grass fnc'd, tons	106,305	1,197	11,970.00	95,172	1,187	7,890.50
Totals............	176,055	....	$366,950.00	147,744	....	$419,547.70

Corn on hand March 1, 1911, 10,674 bushels; March 1, 1912, 355 bushels.
Wheat on hand March 1, 1911, 5025 bushels; March 1, 1912, 227 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—Scott County.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops .... acres	176,055	$366,950.00	147,744	$419,547.70
Animals slaughtered and sold for slaughter....	....	82,207.00	....	18,246.00
Poultry and eggs sold........................	....	17,948 00	....	10,600.00
Wool clip................................ lbs.	....	....	85	17.00
Cheese.................................... lbs.	....	....	306	42.84
Butter..................................... lbs.	38,799	9,311.76	25,983	6,495.75
Milk sold....................................	....	15,415.00	....	13,856.00
Honey and beeswax..................... lbs.	....	....	100	15.00
Wood marketed..............................	....	....	....	....
Totals..	....	$441,831.76	....	$468,820.29

LIVE STOCK.—Scott County.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses......................	4,680	$528,840.00	4,296	$485,448.00	75	124
Mules and asses..............	803	105,193.00	612	80,172.00	13	6
Milch cows..................	1,983	79,820.00	1,750	78,750.00	24	35
Other cattle.................	3,282	88,614.00	2,960	94,720.00	73	122
Sheep........................	11	46.20	2	8.50	....	10
Swine........................	1,425	14,250.00	1,174	11,740.00	25	29
Totals.................	12,184	$816,263.20	10,794	$750,838.50	210	326

Number of dogs in county March 1, 1911, 442; March 1, 1912, 437.

SEDGWICK COUNTY.

Organized in 1870; area, 1008 square miles; population, 75,765; rank in population, 2; assessed valuation, $114,110,533; miles of railroad, main track, 256.50; county seat, Wichita, population, 56,379.

POPULATION AND VALUATION.—Sedgwick County.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......	75,304	75,765	$32,798,021	$48,488,315	$19,622,247	$13,201,950	$114,110,533
Afton tp..........	388	376	$957,824	....	$115,230	....	$1,073,054
Goddard..........	224 } 686	221 } 671	1,049,257	$61,990	178,480	$219,671	1,509,398
Attica tp..........	462	450					
Delano tp.........	961	1,012	1,550,774	166,335	215,950	395,842	2,328,901
Eagle tp..........	625	628	1,211,563	29,040	222,275	237,666	1,700,544
Erie tp............	244	275	1,046,102	4,775	86,755	217,389	1,355,021
Garden Plain.....	294 } 802	281 } 811	983,944	56,320	190,535	215,507	1,446,306
Garden Plain tp...	508	530					
Grand River tp....	372	364	885,953	....	79,910	8,436	974,299
Grant tp..........	665	694	1,197,425	5,880	221,420	61,091	1,485,816

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POPULATION AND VALUATION.—SEDGWICK COUNTY.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
Mount Hope	488	1,019	482	985	$1,238,150	$214,260	$317,830	$177,662	$1,947,402
Greeley tp	531		503						
Gypsum tp		454		471	997,043	....	159,940	8,800	1,165,783
Illinois tp		433		432	1,003,928	3,680	100,235	108,058	1,215,901
Kechi tp		842		888	1,533,741	38,665	250,030	1,192,447	3,014,883
Lincoln tp		609		609	1,061.184	13,810	306,180	361,491	1,732,615
Minneha tp		485		515	1,099,197	....	132,330	303,463	1,534,990
Cheney	642	980	612	956	962,573	338,505	319,505	236,597	1,857,180
Morton tp	338		344						
Clear Water	602	1,013	557	963	1,059,255	202,300	293,420	415,369	1,970,344
Ninnescah tp	411		406						
Ohio tp		444		433	1,061,924	22,515	182,960	385,492	1,652,891
Park tp		781		749	1,336,512	33,080	234,500	154,295	1,758,387
Payne tp		519		529	1,121,229	11,580	146,090	265,530	1,544,429
Riverside tp		551		886	1,427,395	43,110	196,980	685,798	2,353,283
Derby	259	1,146	249	1,121	1,203,760	223,580	325,680	815,746	2,568,766
Mulvane	289		302						
Rockford tp	598		570						
Salem tp		628		595	1,171,621	4,425	131,510	395,565	1,703,121
Andale	259	915	291	941	1,205,895	52,045	186,930	175,260	1,620,130
Sherman tp	656		650						
Colwich	260	825	239	784	1,256,528	79,110	150,310	196,270	1,682,218
Union tp	565		545						
Valley Center	359	984	380	974	1,436,959	125,965	327,530	771,654	2,662,108
Valley Center tp	625		594						
Viola	118	400	145	371	1,022,602	35,895	187,160	357,239	1,602,896
Viola tp	282		226						
Waco tp		561		617	1,169,118	53,730	164,580	367,841	1,755,269
Wichita tp		1,389		736	1,556,615	216.810	852,209	413,809	3,039,443
Wichita:									
1st ward	9,754	55,583	9,776	56,379	....	46,450,910	13,346,283	4,057,962	63,855,155
2d ward	10,158		10,450						
3d ward	8,831		8,832						
4th ward	10.437		10,886						
5th ward	8,533		8,530						
6th ward	7,870		7,905						

FARM AND CROP STATISTICS.—SEDGWICK COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	98,920	1,384,880	$1,204,845.60	124,505	1,992,080	$1,693,268.00
Spring wheat.......bu.	....	....	....	....	....	....
Corn...............bu.	158,898	2,224,572	1,312,497.48	131,595	3,421,470	1,847,593.80
Oats...............bu.	77,706	1,554,120	575,024.40	53,955	1,456,785	568,146.15
Rye................bu.	1,768	21,216	18.033.60	2,195	39,510	27,657.00
Barley.............bu.	54	756	393.12	114	2,736	1,208.84
Emmer ("speltz")..bu.	....	....	....	....	....	....
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	1,501	21,014	25,006.66	991	78,289	62,631.20
Sweet potatoes......bu.	521	36,991	36,991.00	890	104,130	78,097.50
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	30	105	189.00	5	40	60.00
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	....	....	....	....	....	....
Millet & hungarian, tons	945	1,890	11,340.00	934	1,868	9,340.00
Sugar-beets.......tons	7	35	175.00	15	150	750.00
Sorghum for—						
syrup or sugar...gals.	90	5,400	2,700.00	63	4,725	2,268.00
forage or grain..tons	2,482	....	21,888.00	3,245	....	35,695.00
Milo maize........tons	54	162	1,215.00	510	1,275	6,375.00
Kafir-corn........tons	12,135	42,473	254,838.00	27,711	83,133	374,098.50
Jerusalem corn....tons	73	256	1,536.00	12	36	162.00

FARM AND CROP STATISTICS.—SEDGWICK COUNTY.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Timothy..........tons	100	* 24,404	$219,686.00	23	† 38,296	$421,256.00
Clover............tons	23			....		
Blue-grass........tons	304			60		
Alfalfa...........tons	28,547			31,553		
Orchard-grass.....tons	17			63		
Other tame grasses, tons	199			41		
Prairie-grass fnc'd, tons	133,708	19,922	149,415.00	117,683	20,784	187,056.00
Totals.............	518,032	....	$3,835,723.86	496,113	....	$5,815,657.99

Corn on hand March 1, 1911, 359,507 bushels; March 1, 1912, 260,016 bushels.
Wheat on hand March 1, 1911, 86,225 bushels; March 1, 1912, 35,260 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—SEDGWICK COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops..............................acres	518,032	$3,835,723.86	496,113	$5,815,657.99
Animals slaughtered and sold for slaughter....	....	1,448,199.00	....	1,135,585.00
Poultry and eggs sold..........................	....	202,186.00	....	191,427.00
Wool clip.................................lbs.	4,650	790.50	2,898	579.60
Cheese....................................lbs.	1,775	230.75	3,851	[illegible].14
Butter....................................lbs.	1,265,018	345,061.32	1,282,944	350,796.00
Milk sold......................................	....	179,688.00	....	248,148.00
Honey and beeswax.........................lbs.	38,085	5,717.45	12,061	1,817.65
Wood marketed..................................	....	589.00	....	269.00
Totals...	....	$6,018,185.88	....	$7,244,959.88

LIVE STOCK.—SEDGWICK COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses......................	20,784	$2,348,592.00	19,963	$2,255,819 00	375	737
Mules and asses..............	3,808	498,848.00	3,825	501,075.00	36	60
Milch cows...................	13,949	557,960.00	15,458	695,610.00	190	397
Other cattle.................	19,208	518,616.00	17,923	572,536.00	274	854
Sheep........................	4,056	17,085.20	7,588	32,249.00	140	301
Swine........................	44,489	444,890.00	29,056	290,560.00	2,112	23,015
Totals.................	106,294	$4,385,941.20	93,813	$4,348,849.00	3,127	25,364

Number of dogs in county March 1, 1911, 3969; March 1, 1912, 4862.
Number of sheep killed by dogs, year ending March 1, 1911, 8; March 1, 1912, 6.
Number of sheep killed by wolves, year ending March 1, 1911, 34; March 1, 1912, 7.

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SEWARD COUNTY.

Organized in 1886; area, 648 square miles; population, 4228; rank in population, 87; assessed valuation, $6,624,562; miles of railroad, main track, 29.85; county seat, Liberal, population, 1937.

POPULATION AND VALUATION.—SEWARD COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county	4,833	4,228	$3,168,112	$694,429	$1,281,895	$1,480,126	$6,624,562
Fargo	1,042	1,029	$974,825	$14,197	$332,680	$887,180	$2,208,882
Liberal	1,955 } 2,778	1,937 } 2,732	14,625	676,498	670,520	71,413	1,433,061
Liberal tp	823	795	1,061,065	3,739	194,080	520,317	1,779,151
Seward	513	467	1,117,597	....	84,665	1,216	1,203,478

FARM AND CROP STATISTICS.—SEWARD COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	12,700	50,800	$43,180.00	33,257	399,084	$299,313.00
Spring wheat.......bu.	72	360	270.00	98	1,000	726.60
Corn...............bu.	7,706	84,766	46,621.30	6,511	130,220	71,621.00
Oats...............bu.	3,143	31,430	15,715.00	1,399	27,980	11,471.80
Rye................bu.	5	25	21.25	31	372	260.40
Barley.............bu.	1,627	11,389	5,694.50	1,169	24,549	10,801.56
Emmer ("speltz")..bu.	373	2,238	1,119.00	118	2,360	1,132.80
Buckwheat..........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	84	1,932	2,415.00	110	8,800	7,920.00
Sweet potatoes......bu.	1	40	60.00	2	150	150.00
Castor-beans........bu.	....	....	....	1	8	9.20
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	4,583	1,695,710	101,742.60	9,061	3,171,350	95,140.50
Millet & hungarian, tons	392	392	2,744.00	503	754	3,770.00
Sugar-beets.......tons	....	....	....	3	21	105.00
Sorghum for—						
syrup or sugar...gals.	40	2,000	1,000.00	58	3,480	1,740.00
forage or grain..tons	9,442	....	66,094.00	9,644	....	96,440.00
Milo maize........tons	19,207	28,811	187,272.00	14,125	35,312	194,216.00
Kafir-corn........tons	13,015	26,030	156,180.00	12,545	37,635	188,175.00
Jerusalem corn....tons	....	....	....	145	435	2,175.00
Timothy...........tons	....	* 760	6,840.00	....	† 1,008	9,072.00
Clover............tons	....			....		
Blue-grass........tons	....			....		
Alfalfa...........tons	520			256		
Orchard-grass.....tons	....			....		
Other tame grasses, tons	....			....		
Prairie-grass fnc'd, tons	75,376	2,902	23,216.00	69,032	2,390	15,535.00
Totals............	148,286	....	$660,184.65	158,068	....	$1,009,774.86

Corn on hand March 1, 1911, 10,005 bushels; March 1, 1912, 11,700 bushels.
Wheat on hand March 1, 1911, 3032 bushels; March 1, 1912, 75 bushels.

*** Product of 1910.** **† Product of 1911.**

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SUMMARY.—SEWARD COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops .... acres	148,286	$660,184.65	158,068	$1,009,774.86
Animals slaughtered and sold for slaughter....	....	52,287.00	....	61,727.00
Poultry and eggs sold........................	....	7,887.00	....	9,196.00
Wool clip.............................lbs.	2,130	362.10	10,000	2,000.00
Cheese.................................lbs.	325	42.25	260	36.40
Butter.................................lbs.	47,295	11,350.80	41,948	10,487.00
Milk sold..................................	....	14,710.00	....	11,147.00
Honey and beeswax.....................lbs.	....	....	....	....
Wood marketed..............................	....	....	....	....
Totals..................................	....	$746,823.80	....	$1,104,367.26

LIVE STOCK.—SEWARD COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses......................	2,747	$310,411.00	2,859	$323,067.00	144	90
Mules and asses.............	854	111,874.00	1,008	132,048.00	9	13
Milch cows..................	2,900	116,000.00	3,275	147,375.00	75	68
Other cattle................	5,748	155,196.00	6,165	197,280.00	116	104
Sheep.......................	2,239	9,403.80	85	361.25	312	2
Swine.......................	1,481	14,810.00	1,492	14,920.00	67	88
Totals..................	15,969	$717,694.80	14,884	$815,051.25	723	365

Number of dogs in county March 1, 1911, 181; March 1, 1912, 322.
Number of sheep killed by dogs, year ending March 1, 1911, 1.
Number of sheep killed by wolves, year ending March 1, 1912, 1.

SHAWNEE COUNTY.

Organized in 1855; area, 558 square miles; population, 64,225; rank in population, 3; assessed valuation, $83,605,789; miles of railroad, main track, 116.30; county seat, Topeka, population, 46,385.

POPULATION AND VALUATION.—SHAWNEE COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......	60,698	64,225	$18,760,335	$35,579,270	$17,750,710	$11,515,474	$83,605,789
Auburn tp........	842	926	$1,245,600	$32,695	$200,705	$1,688	$1,480,688
Dover tp.........	972	1,021	1,470,520	41,700	383,390	394,858	2,290,468
Menoken tp......	764	710	1,728,970	....	334,880	454,477	2,518,327
Mission tp........	1,116	1,138	1,514,675	100,345	287,335	359,842	2,262,197
Monmouth tp.....	1,227	1,251	1,552,420	26,630	293,860	204,001	2,076,911
Rossville.........	600 } 1,366	574 } 1,391	1,828,165	222,110	383,865	582,090	3,016,230
Rossville tp.......	766	817					
Silver Lake.......	218 } 888	226 } 938	1,626,350	81,335	346,800	594,808	2,648,793
Silver Lake tp....	670	712					
Soldier tp.........	2,662	2,741	2,967,015	272,975	452,565	1,416,662	5,109,217

POPULATION AND VALUATION.—SHAWNEE COUNTY.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
Tecumseh tp.		954		1,005	$1,191,470	$2,155	$172,250	$586,199	$1,962,074
Oakland	1,711	4,511	1,734	5,038	2,874,040	2,026,780	629,165	1,105,826	6,136,811
Topeka tp.	2,800		3,304						
Williamsport		1,714		1,681	1,261,110	24,655	171,045	497,808	1,954,618
Topeka:									
1st ward	5,045	* 43,682	5,271	46,385	....	32,747,890	14,096,850	5,817,215	52,160,455
2d ward	10,076		10,556						
3d ward	9,279		9,928						
4th ward	7,242		7,604						
5th ward	7,652		8,244						
6th ward	4,388		4,782						

* Federal census, 1910.

FARM AND CROP STATISTICS.—SHAWNEE COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value
Winter wheat.......bu.	9,175	211,025	$179,371.25	15,048	361,152	$303,367.68
Spring wheat.......bu.	67	1,005	743.70	52	1,040	821.60
Corn...............bu.	73,997	1,923,922	1,015,874.76	69,930	1,818,180	1,036,362.60
Oats...............bu.	11,601	232,020	97,448.40	4,548	150,084	58,532.76
Rye................bu.	87	1,740	1,479.00	129	2,967	2,225.25
Barley.............bu.	19	418	229.90	8	200	90.00
Emmer ("speltz")..bu.	28	700	315.00	....	....	....
Buckwheat.........bu.	1	10	10.00	1	11	11.00
Irish potatoes.......bu.	1,362	95,340	80,085.60	1,026	141,588	83,536.92
Sweet potatoes......bu.	265	29,150	25,943.50	359	49,901	37,425.75
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	2	16	24 00
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	....	....	....	....	....	....
Millet & hungarian, tons	1,370	2,740	19,180 00	1,592	3,184	19,104.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	187	18,700	9,350.00	274	21,920	10,302.40
forage or grain..tons	1,303	....	19,545.00	2,524	....	32,812.00
Milo maize........tons	93	279	1,814.00	63	157	863.50
Kafir-corn........tons	4,319	17,276	103,656.00	7,775	27,212	136,060.00
Jerusalem corn....tons	7	28	168.00	104	364	1,820.00
Timothy..........tons	4,623	* 23,206	278,472.00	3,338	† 16,896	202,752.00
Clover............tons	5,200			4,532		
Blue-grass........tons	4,442			6,206		
Alfalfa...........tons	9,188			10,212		
Orchard-grass.....tons	366			359		
Other tame grasses, tons	1,746			1,498		
Prairie-grass fnc'd, tons	84,010	26,706	267,060.00	81,899	11,794	117,940.00
Totals............	213,456	....	$2,100,746.11	211,479	....	$2,044,051.46

Corn on hand March 1, 1911, 598,900 bushels; March 1, 1912, 407,173 bushels.
Wheat on hand March 1, 1911, 2,070 bushels; March 1, 1912, 4,401 bushels.

*** Product of 1910. † Product of 1911.**

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SUMMARY.—SHAWNEE COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops.... acres	218,456	$2,100,746.11	211,479	$2,044,051.46
Animals slaughtered and sold for slaughter....	....	628,841.00	....	606,077.00
Poultry and eggs sold....	....	116,731.00	....	106,874.00
Wool clip.... lbs.	3,825	650.25	5,436	1,087.20
Cheese.... lbs.	....	....	1,104	154.56
Butter.... lbs.	5,257,117	1,558,820.60	8,257,878	2,383,736.81
Milk sold....	....	186,439.00	....	191,783.00
Honey and beeswax.... lbs.	4,839	733.85	4,535	687.55
Wood marketed....	....	1,579.00	....	1,062 00
Totals....	....	$4,594,040.81	....	$5,335,463.58

LIVE STOCK.—SHAWNEE COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses....	13,776	$1,556,688.00	13,684	$1,546,292.00	183	256
Mules and asses....	2,248	294,488.00	2,190	286,890.00	49	16
Milch cows....	11,123	444,920.00	12,021	540,945.00	115	167
Other cattle....	13,934	376,218.00	13,722	439,104.00	217	212
Sheep....	2,806	11,785.20	2,068	8,759.00	78	281
Swine....	21,657	216,570.00	13,919	189,190.00	2,608	5,561
Totals....	65,544	$2,900,669.20	62,604	$3,011,210.00	3,250	6,493

Number of dogs in county March 1, 1911, 3155; March 1, 1912, 3326.
Number of sheep killed by dogs, year ending March 1, 1911, 97; March 1, 1912, 5.
Number of sheep killed by wolves, year ending March 1, 1911, 4; March 1, 1912, 11.

SHERIDAN COUNTY.

Organized in 1880; area, 900 square miles; population, 4744; rank in population, 82; assessed valuation, $8,600,337; miles of railroad, main track, 43.52; county seat, Hoxie, population, 449.

FARM AND CROP STATISTICS.—SHERIDAN COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.... bu.	....	....	....	42,602	170,408	$120,969.68
Spring wheat.... bu.	1,323	....	....	656	3,896	2,689.84
Corn.... bu.	69,200	....	....	50,775	558,525	290,433.00
Oats.... bu.	14,177	....	....	16,010	192,120	76,848.00
Rye.... bu.	411	....	....	241	1,928	1,368.88
Barley.... bu.	21,902	....	....	7,299	80,289	32,115.60
Emmer ("speltz").. bu.	2,007	....	....	625	6,250	3,062.50
Buckwheat.... bu.	....	....	....	....	....	....
Irish potatoes.... bu.	351	....	....	219	10,950	9,636.00
Sweet potatoes.... bu.	....	....	....	....	....	....
Castor-beans.... bu.	....	....	....	....	....	....
Cotton.... lbs.	....	....	....	....	....	....
Flax.... bu.	....	....	....	20	80	120.00

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FARM AND CROP STATISTICS.—SHERIDAN COUNTY.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	....	....	....	....	....	....
Millet & hungarian, tons	2,171	1,628	$13,024.00	2,155	2,693	$13,465.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	....	....	....	1	55	27.50
forage or grain..tons	18,116	....	90,580.00	14,119	....	112,952.00
Milo maize........tons	45	23	184.00	1,934	3,868	19,340.00
Kafir-corn........tons	15,630	7,815	62,520.00	17,620	44,050	198,225.00
Jerusalem corn....tons	....	....	....	15	87	166.50
Timothy..........tons	....	* 10,756	118,316.00	....	† 8,687	60,809.00
Clover............tons	....			....		
Blue-grass........tons	....			....		
Alfalfa...........tons	4,920			5,779		
Orchard-grass.....tons	....			....		
Other tame grasses, tons	....			....		
Prairie-grass fnc'd, tons	118,298	1,810	18,100.00	133,184	1,786	8,930.00
Totals............	268,551	....	$302,724.00	293,204	....	$951,178.50

Corn on hand March 1, 1911, 54,368 bushels; March 1, 1912, 2,989 bushels.
Wheat on hand March 1, 1911, 32,820 bushels; March 1, 1912, 1,165 bushels.

*** Product of 1910. Product of 1911.**

POPULATION AND VALUATION.—SHERIDAN COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land	City lots.	Personal.	Railroad, etc.	Total.
The county.......		5,309		4,744	$5,553,271	$250,600	$1,274,460	$1,522,006	$8,600,337
Adell tp...........		307		259	$367,073	....	$64,170	$152	$431,395
Bloomfield tp......		163		116	249,664	....	18,165	14,554	282,383
Bow Creek tp......		461		433	428,319	....	77,005	1,394	506,718
Hoxie............	457	629	449	616	....	$196,750	375,475	....	572,225
Kenneth tp........	172		167		222,326	....	43,460	175,858	441,644
Logan tp..........		317		277	404,211	....	52,685	334,354	791,250
Parnell tp.........		287		253	487,011	....	40,495	331	527,837
Prairie Dog tp....		169		166	226,233	....	32,505	330,714	589,452
Saline tp..........		777		670	871,589	....	141,360	2,213	1,015,162
Selden............	308	647	253	527	....	53,850	87,885	43,239	184,974
Sheridan tp.......	339		274		320,896	....	30,525	270,846	622,267
Solomon tp........		545		503	674,741	....	103,105	2,506	780,352
Springbrook tp....		570		339	626,443	....	70,235	841	697,519
Union tp..........		248		239	223,869	....	48,390	210	272,469
Valley tp..........		389		346	450,896	....	89,000	344,794	884,690

SUMMARY.—SHERIDAN COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops..............................acres	268,551	$302,724.00	293,204	$951,178.50
Animals slaughtered and sold for slaughter....	....	214,981.00	....	120,536.00
Poultry and eggs sold.........................	....	45,489.00	....	30,780.00
Wool clip...............................lbs.	8	1.36	1,225	245.00
Cheese..................................lbs.	....	....	....	....
Butter..................................lbs.	84,129	20,190.96	67,929	16,982.25
Milk sold.....................................	....	28,205.00	....	24,487.00
Honey and beeswax......................lbs.	....	....	....	....
Wood marketed...............................	....	25.00	....	....
Totals.......................................	....	$611,616.32	....	$1,144,108.75

LIVE STOCK.—SHERIDAN COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	7,846	$886,598.00	7,107	$808,091.00	85	111
Mules and asses	1,284	168,204.00	1,171	158,401.00	8	5
Milch cows	3,979	159,160.00	3,343	150,435.00	15	77
Other cattle	6,861	185,247.00	3,599	115,168.00	41	145
Sheep	451	1,894.20	275	1,168.75	....	....
Swine	9,590	95,900.00	3,857	38,570.00	199	1,291
Totals	30,011	$1.497.003.20	19,352	$1,261,833.75	348	1,629

Number of dogs in county March 1, 1911, 872; March 1, 1912, 774.
Number of sheep killed by wolves, year ending March 1. 1912. 2.

SHERMAN COUNTY.

Organized in 1886; area, 1080 square miles; population, 3705; rank in population, 90; assessed valuation, $8,477,083; miles of railroad, main track, 35.35; county seat, Goodland, population, 1553.

FARM AND CROP STATISTICS.—SHERMAN COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	....	....	....	12,642	126,420	$96,079.20
Spring wheat.......bu.	16,388	....	....	14,068	160,572	120,354.00
Corn..............bu.	34,597	....	....	19,927	398,540	191,299.20
Oats..............bu.	1,463	....	....	2,823	76,221	28,201.77
Rye...............bu.	425	....	....	236	2,832	1,982.40
Barley............bu.	18,782	....	....	12,255	306,375	122,550.00
Emmer ("speltz")..bu.	284	....	....	40	920	423.20
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	356	....	....	275	21,725	16,293.75
Sweet potatoes......bu.	....	....	....	....	....	....
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco...........lbs.	....	....	....	....	....	....
Broom-corn........lbs.	30	4,500	$225.00	....	....	....
Millet & hungarian, tons	2,142	2,142	17,136.00	2,401	6,002	30,010.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	10	200	100.00	10	650	325.00
forage or grain..tons	10,602	....	53,010.00	8,608	....	68,864.00
Milo maize........tons	287	144	1,152.00	1,011	2,527	12,635.00
Kafir-corn........tons	1,007	1,007	8,056.00	1,538	3,845	17,302.50
Jerusalem corn....tons	1	1	8.00	10	25	112.50
Timothy..........tons	....	* 3,096	40,248.00	....	† 1,988	15,904.00
Clover...........tons	....			....		
Blue-grass........tons	....			....		
Alfalfa...........tons	1,495			1,723		
Orchard-grass.....tons	....			....		
Other tame grasses, tons	....			....		
Prairie-grass fnc'd, tons	211,546	2,011	20,110.00	178,840	1,299	8,443.50
Totals	299,415	....	$140,045.00	256,408	....	$730,780.02

Corn on hand March 1, 1911, 53.553 bushels; March 1, 1912, 1271 bushels.
Wheat on hand March 1, 1911, 22,649 bushels; March 1, 1912, 2084 bushels.

*** Product of 1910.** **† Product of 1911.**

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POPULATION AND VALUATION.—SHERMAN COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county	4.541	3,705	$4,546,245	$853,565	$1,112,730	$1,964,543	$8,477,083
Grant tp.	323	309	$537,115	....	$73,455	....	$610,570
Iowa tp.	145	107	337,565	....	23,925	$392	361,882
Goodland	2,081 } 2,191	1,553 } 1,648	....	$814,060	452,205	225,824	1,492,089
Itasca tp.	110	95	238,455	60	42,900	227,544	508,959
Lincoln tp.	163	118	311,670	3,700	53,645	308,767	677,782
Llanos tp.	214	200	315,415	....	45,420	....	360,835
Logan tp.	131	126	313,080	....	56,380	306,359	675,819
McPherson tp.	142	138	242,160	....	26,575	47	268,782
Shermanville tp.	124	87	313,815	....	55,160	668	369,643
Smoky tp.	214	201	544,725	....	69,460	1,098	615,283
State Line tp.	291	255	277,410	33,255	96,905	278,822	686,392
Union tp.	104	98	272,245	....	29,080	307,847	609,172
Voltaire tp.	358	287	577,125	1,280	60,850	1,325	640,580
Washington tp.	141	131	265,465	1,210	26,770	305,850	599,295

SUMMARY.—SHERMAN COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops acres	299,415	$140,045.00	256,408	$730,780.02
Animals slaughtered and sold for slaughter	....	86,199.00	....	70,115.00
Poultry and eggs sold	....	22,351.00	....	15,258.00
Wool clip lbs.	1,470	249.90	5	1.00
Cheese lbs.	750	97.50	....	....
Butter lbs.	68,732	16,495.68	78,003	19,500.75
Milk sold	....	42,688.00	....	38,059.00
Honey and beeswax lbs.	100	25.00	....	....
Wood marketed	....	355.00	....	....
Totals	....	$308,506.08	....	$873,713.77

LIVE STOCK.—SHERMAN COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1912.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	5,993	$677,209.00	5,988	$676,644.00	96	51
Mules and asses	487	63.797.00	492	64,452.00	10	5
Milch cows	3,904	156,160.00	4,124	185,580.00	17	35
Other cattle	8,756	236,412.00	5,970	191,040.00	37	60
Sheep	45	189.00	57	242.25	....	....
Swine	2,158	21,580.00	1.004	10,040.00	130	17
Totals	21,343	$1.155,347.00	17.635	$1,127.998.25	290	168

Number of dogs in county March 1, 1911, 697; March 1, 1912, 526.
Number of sheep killed by wolves, year ending March 1, 1911, 4.

SMITH COUNTY.

Organized in 1872; area, 900 square miles; population, 15,683; rank in population, 43; assessed valuation, $28,069,083; miles of railroad, main track, 52.62; county seat, Smith Center, population, 1459.

POPULATION AND VALUATION.—SMITH COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......		15,630		15,683	$18,398,918	$1,610,050	$5,853,324	$2,206,791	$28,069,083
Gaylord..........	326	792	332	786	....	$118,445	$132,105	$18,842	$269,392
Banner tp........	466		454		$725,347	....	109,490	1,976	836,813
Beaver tp.........		502		490	636,386	....	211,735	657	848,778
Blaine tp..........		587		569	874,866	22,865	226,015	333,926	1,457,672
Kensington.......	465	950	520	971	....	250,680	242,336	47,493	540,509
Cedar tp..........	485		451		883,878	....	145,720	266,971	1,296,569
Smith Center.....	1,443	1,922	1,459	1,917	....	690,960	601,209	72,840	1,374,009
Center tp.........	479		458		875,756	....	202,825	285,809	1,364,390
Cora tp...........		452		479	754,204	520	208,115	878	963,717
Crystal Plains tp..		440		458	833,617	....	174,760	838	1,009,215
Dor tp............		311		324	523,257	....	95,690	1,507	620,454
Garfield tp........		426		401	622,967	....	129,955	39,813	792,735
German tp........		456		471	565,030	....	115,595	317	680,942
Harlan tp.........		591		597	762,678	26,780	210,005	189,592	1,189,055
Harvey tp........		692		720	862,105	40,890	238,520	78,962	1,220,477
Houston tp.......		435		447	567,176	....	166,810	68,534	802,520
Athol............	*....	728	268	710	....	85,360	111,695	21,769	218,824
Lane tp..........	728		442		862,998	....	219,780	302,060	1,384,838
Lincoln tp........		489		475	670,927	....	223,045	646	894,618
Logan tp..........		541		539	700,642	....	158,290	453	859,385
Martin tp.........		530		548	614,713	7,530	174,425	80	796,748
Lebanon..........	723	1,483	769	1,505	....	349,365	332,974	34,583	716,922
Oak tp............	760		736		920,875	....	179 555	284,040	1,384,470
Pawnee tp........		501		515	652,580	....	228,560	175	881,315
Pleasant tp.......		491		505	738,981	....	178,060	159	917,200
Swan tp..........		376		407	751,894	....	168,240	1,017	921,151
Valley tp.........		423		381	771,715	7,655	165,400	149,006	1,093,776
Washington tp....		445		429	703,907	....	139,285	1,947	845,139
Webster tp.......		477		461	683,782	....	175,100	1,025	859,907
White Rock tp....		590		578	838,637	....	188,030	876	1,027,543

* Not reported separately from township in 1911.

FARM AND CROP STATISTICS.—SMITH COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat........bu.	79,612	636,896	$541,361.60	81,698	1,307,168	$1,006,519.36
Spring wheat........bu.	14	....	....	....	....	....
Corn.................bu.	165,238	1,982,856	1,189,713.60	170,109	6,294,033	2,895,255.18
Oats.................bu.	17,267	69,068	31,080.60	7,634	297,726	110,158.62
Rye..................bu.	24	144	118.08	55	825	585.75
Barley...............bu.	62	496	277.76	43	860	387 00
Emmer ("speltz")..bu.	27	216	95.04	....	....	....
Buckwheat..........bu.	23	....	....	....	....	....
Irish potatoes.......bu.	1,521	31,941	32,579.82	1,243	87,010	65,257.50
Sweet potatoes......bu.	....	....	....	....	....	....
Castor-beans........bu.	....	....	....	....	....	....
Cotton..............lbs.	....	....	....	....	....	....
Flax.................bu.	....	....	....	....	....	....
Tobacco.............lbs.	....	....	....	....	....	....
Broom-corn........lbs	....	....	....	....	....	....

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FARM AND CROP STATISTICS.—SMITH COUNTY.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Millet & hungarian, tons	3,996	5,994	$41,958.00	4,852	9,704	$48,520.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	213	8,520	4,260.00	84	5,880	2,940.00
forage or grain..tons	2,517	....	22,653.00	4,343	....	60,802.00
Milo maize........tons	2	4	28.00	90	315	1,575.00
Kafir-corn........tons	2,092	5,230	31,380.00	4,872	19,488	87,696.00
Jerusalem corn....tons	....	....	....	18	52	234.00
Timothy..........tons	4	* 35,264	317,376.00	....	† 31,496	251,968.00
Clover...........tons	....			....		
Blue-grass........tons	....			....		
Alfalfa...........tons	42,233			40,116		
Orchard-grass.....tons	....			25		
Other tame grasses, tons	10			7		
Prairie-grass fnc'd, tons	163,000	8,813	70,504.00	158,832	12,834	83,421.00
Totals............	477,855	....	$2,283,385.50	474,016	....	$4,615,319.41

Corn on hand March 1, 1911, 1,197,408 bushels; March 1, 1912, 669,522 bushels.
Wheat on hand March 1, 1911, 84,487 bushels; March 1, 1912, 39,806 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—SMITH COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops.............acres	477,855	$2,283,385.50	474,016	$4,615,319.41
Animals slaughtered and sold for slaughter....	....	1,478,880.00	....	1,451,991.00
Poultry and eggs sold..........	....	220,067.00	....	186,189.00
Wool clip.............lbs.	2,478	421.26	1,288	257.60
Cheese.............lbs.	....	....	....	....
Butter.............lbs.	321,004	77,040.96	338,617	84,654.25
Milk sold..........	......	123,184.00	....	116,138.00
Honey and beeswax.............lbs.	45,873	6,881.95	8,126	1,224.40
Wood marketed..........	....	231.00	....	125.00
Totals..........	....	$4,190,091.67	....	$6,455,848.66

LIVE STOCK.—SMITH COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses..............	15,168	$1,718,984.00	16,312	$1,843,256.00	307	375
Mules and asses..............	3,355	439,505.00	3,519	460,989.00	17	24
Milch cows..............	10,760	430,400.00	11,842	532,890.00	137	218
Other cattle..............	21,342	576,234.00	17,707	566,624.00	407	780
Sheep..............	851	3,574.20	1,737	7,382.25	4	1
Swine..............	67,671	676,710.00	43,989	439,890.00	804	10,321
Totals..............	119,147	$3,840,407.20	95,106	$3,851,081.25	1,676	11,719

Number of dogs in county March 1, 1911, 2,838; March 1, 1912, 2,772.
Number of sheep killed by dogs, year ending March 1, 1912, 13.
Number of sheep killed by wolves, year ending March 1, 1911, 10; March 1, 1912, 4.

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STAFFORD COUNTY.

Organized in 1879; area, 792 square miles; population, 11,556; rank in population, 57; assessed valuation, $26,425,779; miles of railroad, main track, 67.41; county seat, St. John, population, 1607.

POPULATION AND VALUATION.—STAFFORD COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county	11.752	11.556	$16,945,042	$2,074,155	$5,099,210	$2,307,372	$26,425,779
Albano tp	333	315	$555,880	....	$178,005	$259	$734,144
Byron tp	345	360	727,369	....	129,480	....	856,849
Clear Creek tp	340	360	483,400	....	103,450	....	586,850
Cleveland tp	344	335	892,474	....	140,345	....	1,032,819
East Cooper tp	311	279	835,473	....	118,385	160,072	1,113,930
West Cooper tp	294	274	637,767	....	120,990	....	758,757
Douglas tp	309	322	792,207	....	149,930	73,147	1,015,284
Fairview tp	422	406	968,272	$7,590	205,940	333,990	1,515,792
Macksville	646 } 973	747 } 1,045	....	283,760	304,695	24,592	613,047
Farmington tp	327	298	945,626	17,720	134,790	237,120	1,335,256
Hudson	240 } 564	246 } 564	....	97,095	178,795	17,751	293,641
Hayes tp	324	318	827,125	2,795	132,805	59,977	1,022,702
Lincoln tp	338	350	979,190	....	157,390	75,009	1,211,589
Ohio tp	317	343	756,487	....	114,385	209,309	1,080,181
Putnam tp	239	265	591,495	....	103,815	670	695,980
Richland tp	338	304	885,520	....	193,065	263,736	1,342,321
Rose Valley tp	433	385	879,959	....	176,355	1,041	1,057,355
North Seward tp	531	504	833,524	26,485	276,665	193,824	1,330,498
South Seward tp	323	353	824,013	....	159,970	....	983,983
St. John	1,738 } 2,026	1,607 } 1,887	....	756,525	743,030	77,192	1,576,747
St. John tp	288	280	809,277	....	88,910	213	898,400
Stafford	1,661 } 2,099	1,572 } 2,013	....	857,705	641,710	125,054	1,624,469
Stafford tp	438	441	1,087,108	23,635	199,360	293,587	1,603,690
Union tp	413	447	899,882	845	172,935	1,562	1,075,225
York tp	460	445	732,992	....	174,010	159,267	1,066,270

FARM AND CROP STATISTICS.—STAFFORD COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	183,406	2,567,684	$2,182,531.40	135,501	1,761,513	$1,338,749.88
Spring wheat.......bu.	....	....	....	....	....	....
Corn..............bu.	78,653	1,337,101	748,776.56	134,167	3,354,175	1,677,087.50
Oats..............bu.	11,506	241,626	101,482.92	17,957	538,710	210,096.90
Rye...............bu.	365	4,015	3,212.00	344	4,128	2,889.60
Barley............bu.	97	1,843	1,013.65	109	2,725	1,199.00
Emmer ("speltz")..bu.	10	140	64.40	14	308	141.68
Buckwheat.........bu.	5	40	40.00	2	20	20.00
Irish potatoes.......bu.	276	3,864	4,830.00	248	16,120	13,702.00
Sweet potatoes......bu.	....	....	....	11	990	891.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	130	52,000	3,640.00	620	310,000	11,625.00
Millet & hungarian, tons	87	174	1,218.00	128	256	1,280.00
Sugar-beets.......tons	....	....	....	53	424	2,120.00
Sorghum for—						
syrup or sugar...gals.	31	2,325	1,162.50	190	13,300	6,650.00
forage or grain..tons	3,863	....	34,767.00	6,725	....	73,975.00

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FARM AND CROP STATISTICS.—STAFFORD COUNTY.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Milo maize........tons	40	80	$520.00	5,115	15,345	$176,725.00
Kafir-corn........tons	6,045	15,113	90,678.00	12,641	37,923	189,615.00
Jerusalem corn....tons	30	75	450.00	....	....	....
Timothy..........tons	7	* 5,484	54,840.00	....	† 9,832	88,488.00
Clover...........tons	1			....		
Blue-grass........tons	....			....		
Alfalfa...........tons	4,401			4,945		
Orchard-grass.....tons	4			8		
Other tame grasses, tons	....			7		
Prairie-grass fnc'd, tons	85,546	9,087	72,696.00	89,562	8,911	62,377.00
Totals.............	374.503	....	$3,301,922.48	408,347	....	$3,757,632.56

Corn on hand March 1, 1911, 397,668 bushels; March 1, 1912, 410,017 bushels.
Wheat on hand March 1, 1911, 352,564 bushels; March 1, 1912, 117,018 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—STAFFORD COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops............................acres	374,503	$3,301,922.48	408,347	$3,757,632.56
Animals slaughtered and sold for slaughter....	....	402,965.00	....	255,780.00
Poultry and eggs sold........................	....	73,076.00	....	68,180.00
Wool clip..............................lbs.	600	102.00	1,100	220.00
Cheese.................................lbs.	....	....	....	....
Butter.................................lbs.	306,371	78,529.04	222,913	55,728.25
Milk sold..................................	....	14,400.00	....	14,999.00
Honey and beeswax......................lbs.	995	149.25	1,750	263.00
Wood marketed.............................	....	....	....	10.00
Totals..........................	....	$3,866,143.72	....	$4,152,762.81

LIVE STOCK.—STAFFORD COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses.....................	10,101	$1,141,413.00	9,990	$1,128,870.00	261	387
Mules and asses............	4,848	635,088.00	5,067	663,777.00	84	49
Milch cows.................	6,326	253,040.00	6,693	301,185.00	76	108
Other cattle...............	8,637	233,199.00	9,026	288,832.00	152	307
Sheep......................	356	1,495.20	375	1,593.75	20	3
Swine......................	12,631	126,310.00	11,017	110,170.00	705	1,310
Totals.................	42,899	$2,390,545.20	42,168	$2,494,427.75	1,248	2,164

Number of dogs in county March 1, 1911, 1793; March 1, 1912, 1854.
Number of sheep killed by dogs, year ending March 1, 1912, 2.
Number of sheep killed by wolves, year ending March 1, 1911, 7.

STANTON COUNTY.

Organized in 1887; area, 672 square miles; population, 805; rank in population, 105; assessed valuation, $1,880,371; county seat, Johnson.

POPULATION AND VALUATION.—STANTON COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......	964	805	$1,673,787	$6,149	$199,791	$644	$1,880,371
Mitchell tp........	339	256	$553,865	....	$72,188	$218	$626,271
Stanton tp........	287	246	557,537	$6,149	69,403	256	633,345
Roanoke tp........	338	303	562,385	....	58,200	170	620,755

FARM AND CROP STATISTICS.—STANTON COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	....	....	....	453	3,624	$2,754.24
Spring wheat.......bu.	25	....	....	4	28	21.28
Corn...............bu.	543	....	....	569	11,380	6,828.60
Oats...............bu.	12	....	....	37	666	273.06
Rye................bu.	....	....	....	2	18	12.60
Barley.............bu.	230	1,150	$632.50	136	2,448	1,101.60
Emmer ("speltz")..bu.	71	....	....	100	1,700	850.00
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	4	40	50.00	1	50	47.50
Sweet potatoes......bu.	....	....	....	....	....	....
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	4,085	510,625	25,531.25	3,909	1,368,150	34,203.75
Millet & hungarian, tons	20	10	80.00	....	....	....
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	30	....	....	....	....	....
forage or grain..tons	4,801	....	24,005.00	3,938	....	35,442.00
Milo maize........tons	5,406	4,055	32,440.00	4,362	13,086	65,430.00
Kafir-corn........tons	1,173	880	7,040.00	1,189	3,567	14,268.00
Jerusalem corn....tons	124	93	744.00	35	105	420.00
Timothy...........tons	....			....		
Clover............tons	....			....		
Blue-grass........tons	....			....		
Alfalfa...........tons	....	....	....	....	....	....
Orchard-grass.....tons	....			....		
Other tame grasses, tons	....			....		
Prairie-grass fnc'd, tons	24,240	....	....	32,733	....	....
Totals..............	40,764	....	$90,522.75	47,468	....	$161,652.63

Corn on hand March 1, 1911, 20 bushels.

SUMMARY.—STANTON COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops..........acres	40,764	$90,522.75	47,468	$161,652.63
Animals slaughtered and sold for slaughter....	....	18,104.00	....	10,081.00
Poultry and eggs sold..........	....	1,737.00	....	1,862.00
Wool clip..........lbs.	82,110	13,958.70	....	....
Cheese..........lbs.	390	50.70	460	64.40
Butter..........lbs.	16,212	3,890.88	9,921	2,480 25
Milk sold..........	....	47.00	....	1,093.00
Honey and beeswax..........lbs.	....	....	....	....
Wood marketed..........	....	....	....	....
Totals..........	....	$128,311.03	....	$177,183.28

LIVE STOCK.—STANTON COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses..........	2,018	$228,034.00	2,182	$246,566.00	23	5
Mules and asses..........	220	28,820 00	257	33,667.00	4	....
Milch cows..........	2,773	110,920.00	2,800	103,500.00	2	....
Other cattle..........	4,773	128,871 00	5,747	183,904.00	68	....
Sheep..........	12,286	51,601.20	1,233	5,240.25	5	....
Swine..........	269	2,690.00	174	1,740.00	....	....
Totals..........	22,339	$550,986.20	11,893	$574,617.25	102	5

Number of dogs in county, March 1, 1911, 209; March 1, 1912, 169.
Number of sheep killed by dogs, year ending March 1, 1911, 7.

STEVENS COUNTY.

Organized in 1886; area, 729 square miles; population, 2308; rank in population, 97; assessed valuation, $2,817,495; county seat, Hugoton.

POPULATION AND VALUATION.—STEVENS COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......	2,344	2,308	$2,242,463	$40,902	$533,716	$414	$2,817,495
Center tp.........	661	658	$675,903	$40,902	$189,504	$414	$996,723
Harmony tp.......	690	656	866,593	....	163,079	....	1,029,672
Vorhees tp........	993	994	699,967	....	181,133	....	881,100

FARM AND CROP STATISTICS.—STEVENS COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	2,826	19,782	$16,616.88	6,606	66,060	$49,545.00
Spring wheat.......bu.	115	690	517.50	162	1,580	1,124.00
Corn...............bu.	6,281	62,810	33,289.30	3,149	50,384	26,199.68
Oats...............bu.	1,062	9,558	4,779.00	346	7,266	2,979.06
Rye................bu.	33	231	196.35	30	300	210.00
Barley.............bu.	888	7,104	3,552.00	616	14,168	6,375.60
Emmer ("speltz")..bu.	771	6,168	3,084.00	55	1,100	539.00
Buckwheat..........bu.						
Irish potatoes.......bu.	5	125	156.25			
Sweet potatoes......bu.				1	75	93.75
Castor-beans........bu.						
Cotton.............lbs.				20	4,000	400.00
Flax...............bu.						
Tobacco............lbs.						
Broom-corn........lbs.	11,074	3,875,900	232,554.00	14,811	5,183,850	142,555.87
Millet & hungarian, tons	25	25	175.00	40	60	300.00
Sugar-beets.......tons						
Sorghum for—						
syrup or sugar...gals.	20	1,100	550.00	6	300	150.00
forage or grain..tons	7,872		39,360.00	7,635		68,715.00
Milo maize........tons	15,914	31,828	222,796.00	14,194	28,388	156,134.00
Kafir-corn........tons	9,785	19,570	136,990.00	9,147	18,294	91,470.00
Jerusalem corn....tons	10	20	140.00			
Timothy..........tons						
Clover............tons						
Blue-grass........tons						
Alfalfa...........tons	40					
Orchard-grass.....tons						
Other tame grasses, tons						
Prairie-grass fnc'd, tons	81,097	869	6,952.00	74,761		
Totals............	137,818		$701,708.28	131,579		$546,790.96

Corn on hand March 1, 1911, 28,841 bushels; March 1, 1912, 10,085 bushels.
Wheat on hand March 1, 1911, 825 bushels; March 1, 1912, 500 bushels.

SUMMARY.—STEVENS COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops.............................acres	137,818	$701,708.28	131,579	$546,790.96
Animals slaughtered and sold for slaughter....		64,067.00		65,556.00
Poultry and eggs sold.........................		6,410.00		6.381.00
Wool clip.................................lbs.				
Cheese....................................lbs.	50	6.50		
Butter....................................lbs.	39,995	9,598.80	41,870	10,467.50
Milk sold.....................................		2,210.00		2,740.00
Honey and beeswax.........................lbs.				
Wood marketed.................................				
Totals.......................................		$784.000.58		$631.935.46

LIVE STOCK.—STEVENS COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	3,239	$366,007.00	3,327	$375,951.00	125	176
Mules and asses	761	99,691.00	868	113,708.00	7	13
Milch cows	2,679	107,160.00	3,385	152,325.00	35	63
Other cattle	5,800	156,600.00	5,273	168,736.00	125	396
Sheep	1,006	4,225.20	1,200	5,100.00	54	200
Swine	1,035	10,350.00	1,389	13,890.00	41	63
Totals	14,520	$744,033.20	15,442	$829,710.00	387	911

Number of dogs in county March 1, 1911, 494; March 1, 1912, 474.
Number of sheep killed by dogs, year ending March 1, 1912, 4.

SUMNER COUNTY.

Organized in 1871; area, 1188 square miles; population, 28,840; rank in population, 12; assessed valuation, $53,636,916; miles of railroad, main track, 280.68; county seat, Wellington, population, 6302.

FARM AND CROP STATISTICS.—SUMNER COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	50,192	501,920	$446,708.80	95,874	1,342,236	$1,127,478.24
Spring wheat.......bu.	130	1,040	852.80	53	636	5[illegible]2.44
Corn..............bu.	195,668	2,739,352	1,506,643.60	172,832	4,666,464	2,333,232.00
Oats..............bu.	157,303	3,775,272	1,359,097.92	108,476	3,362,756	1,210,592.16
Rye...............bu.	1,855	22,260	18,475.80	2,724	54,480	39,225.60
Barley............bu.	153	2,295	1,147.50	130	3,120	1,404.00
Emmer ("speltz")..bu.	10	100	45.00	....	....	....
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	806	8,060	9,833.20	558	49,662	39,729.60
Sweet potatoes......bu.	70	7,000	7,910.00	49	6,076	5,468.40
Castor-beans........bu.	20	160	200.00	....	....	....
Cotton.............lbs.	10	2,500	250.00	....	....	....
Flax...............bu.	49	147	256.25	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	80	40,000	2,800.00	380	177,460	6,211.10
Millet & hungarian, tons	582	1,164	7,566.00	445	890	4,450.00
Sugar-beets.......tons	4	16	80.00	....	....	....
Sorghum for—						
syrup or sugar...gals.	74	4,440	2,220.00	173	13,840	6,228.00
forage or grain..tons	2,404	....	16,828.00	5,413	....	54,130.00
Milo maize........tons	451	1,353	9,471.00	352	880	4,400.00
Kafir-corn........tons	18,710	74,840	486,460.00	61,599	184,797	831,586.50
Jerusalem corn....tons	....	....	....	....	....	....
Timothy...........tons	37	* 21,332	213,320.00	....	† 25,650	230,850.00
Clover............tons	41			10		
Blue-grass........tons	1,031			89		
Alfalfa...........tons	24,266			28,077		
Orchard-grass.....tons	13			....		
Other tame grasses, tons	113			106		
Prairie-grass fnc'd, tons	147,199	11,385	91,080.00	147,594	16,802	126,015.00
Totals	601,271	....	$4,181,245.87	624,934	....	$6,021,503.04

Corn on hand March 1, 1911, 215,112 bushels; March 1, 1912, 285,324 bushels.
Wheat on hand March 1, 1911, 110,612 bushels; March 1, 1912, 33,240 bushels.

* Product of 1910. † Product of 1911.

POPULATION AND VALUATION.—SUMNER COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county........		28,720		28,840	$27,784,027	$7,059,839	$9,056,345	$9,736,705	$53,636,916
Avon tp..........		425		423	$852,285	$7,791	$165,140	$430,650	$1,455,866
Belle Plaine.......	771	1,399	759	1,407	....	335,454	255,110	59,540	650,104
Belle Plaine tp....	628		648		1,374,573	....	277,380	603,000	2,254,953
Bluff tp..........		530		547	1,096,812	1,470	118,780	72,670	1,289,732
Caldwell..........	1,900	2,621	2,133	2,896	....	886,604	555,520	197,690	1,639,814
Caldwell tp.......	721		763		1,183,071	....	150,185	348,430	1,681,686
Chikaska tp.......		340		343	814,467	....	127,735	....	942,202
Conway Springs..	917	1,362	904	1,328	....	344,362	243,760	73,970	662,092
Conway tp........	444		424		814,383	16,622	131,020	216,100	1,178,125
Creek tp..........		413		411	703,893	....	90,140	90,160	884,193
Argonia..........	416	849	437	868	....	128,757	117,750	37,060	283,567
Dixon tp..........	433		431		713,388	....	111,280	380,210	1,204,878
Downs tp.........		658		652	846,591	27,799	183,790	638,520	1,696,700
Eden tp..........		434		456	845,671	33,217	151,650	314,540	1,345,078
Falls tp..........		763		768	1,243,104	23,678	202,375	479,970	1,949,127
Mulvane..........	695	1,192	754	1,273	....	296,299	294,990	89,870	681,159
Gore tp..........	497		519		834,917	....	148,330	511,940	1,495,187
Green tp..........		409		389	758,735	....	137,930	210	896,875
Guelph tp.........		637		736	1,165,048	8,946	214,790	69,860	1,458,644
Harmon tp........		439		399	724,964	2,215	101,710	335,970	1,164,859
Illinois tp.........		386		399	832,171	5,229	73,550	123,280	1,034,230
Jackson tp........		438		478	881,176	5,558	128,515	226,610	1,241,859
London tp........		569		537	1,085,067	17,640	193,320	319,710	1,615,737
Morris tp.........		367		357	714,533	....	107,080	1,670	823,283
Osborn tp........		553		545	839,470	32,692	172,610	270,010	1,314,782
Oxford...........	629	1,200	646	1,182	....	210,215	248,100	75,320	533,635
Oxford tp.........	571		536		1,127,229	....	169,030	412,560	1,708,819
Palestine tp.......		446		493	959,521	....	198,190	192,760	1,350,471
Milan............	241	632	228	622	....	75,737	79,460	16,140	171,337
Ryan tp..........	391		394		769,027	....	114,720	245,680	1,129,427
Seventy-Six tp....		536		589	905,756	7,602	87,680	460,310	1,461,348
Hunnewell........	197	1,392	248	1,416	....	64,454	64,480	30,520	159,454
South Haven.....	408		406		....	155,195	104,310	55,640	315,145
South Haven tp...	787		762		1,203,966	....	163,600	320,050	1,687,616
Springdale tp.....		651		645	699,446	105,976	106,080	179,790	1,091,292
Sumner tp........		460		456	791,212	11,036	177,030	154,070	1,133,348
Valverde tp.......		486		454	832,003	....	110,150	76,090	1,018,243
Gueda Springs....	167	907	215	989	....	143,292	109,125	6,830	259,247
Walton tp........	740		774		1,213,974	13,996	212,630	71,360	1,511,960
Wellington.......	6,694	7,227	6,302	6,782	....	4,079,423	2,529,660	681,100	7,290,183
Wellington tp.....	533		480		957,574	18,580	127,660	866,845	1,970,659

SUMMARY.—SUMNER COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops ....acres	601,271	$4,181,245.87	624,934	$6,021,508.04
Animals slaughtered and sold for slaughter....	....	1,214,435 00	....	916,831.00
Poultry and eggs sold..........................	....	166,154 00	....	176,335.00
Wool clip..................................lbs.	3,248	552.16	1,507	301.40
Cheese.....................................lbs.	....	....	....	....
Butter.....................................lbs.	436.621	104,789.04	429,866	107,466.50
Milk sold....................................	....	91,521.00	....	125,545.00
Honey and beeswax.......................lbs.	23,446	3,536.30	17,608	2,657.90
Wood marketed...............................	....	280.00	....	139 00
Totals....................................	....	$5,762,563.37	....	$7,350,778.84

LIVE STOCK.—Sumner County.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	21,012	$2,374,356.00	20,775	$2,347,575.00	301	710
Mules and asses	4,820	631,420.00	4,998	654,788.00	34	42
Milch cows	11,675	467,000.00	13,770	619,650.00	133	227
Other cattle	16,788	453,276.00	17,428	557,696.00	171	705
Sheep	1,451	6,094.20	2,522	10,718.50	99	72
Swine	43,595	435,950.00	32,098	320,980.00	680	16,742
Totals	99,341	$4,368,096.20	91,591	$4,511,357.50	1,418	18,498

Number of dogs in county March 1, 1911, 3456; March 1, 1912, 3515.
Number of seep killed by dogs, year ending March 1, 1911, 10.
Number of sheep killed by wolves, year ending March 1, 1911, 7; March 1, 1912, 8.

THOMAS COUNTY.

Organized in 1885; area, 1080 square miles; population, 4007; rank in population, 88; assessed valuation, $11,409,505; miles of railroad, main track, 76.03; county seat, Colby, population, 826.

FARM AND CROP STATISTICS.—Thomas County.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat . . . bu.				65,173	325,865	$231,364.15
Spring wheat . . . bu.	5,622			935	4,675	3,310.75
Corn . . . bu.	44,660			27,419	356,447	185,352.44
Oats . . . bu.	12,959			18,229	236,977	94,790.80
Rye . . . bu.	418			242	1,694	1,185.80
Barley . . . bu.	40,358			20,521	307,815	123,126.00
Emmer ("speltz") . . bu.	246			104	1,040	509.60
Buckwheat . . . bu.	15					
Irish potatoes . . . bu.	395			228	18,012	14,769.84
Sweet potatoes . . . bu.						
Castor-beans . . . bu.						
Cotton . . . lbs.						
Flax . . . bu.						
Tobacco . . . lbs.						
Broom-corn . . . lbs.	180	18,000	$990.00			
Millet & hungarian, tons	1,296	1,296	11,016.00	981	1,716	8,580.00
Sugar-beets . . . tons						
Sorghum for—						
syrup or sugar . . . gals.				40	2,400	1,200.00
forage or grain . . tons	18,461		92,305.00	20,169		171,436.50
Milo maize . . . tons	6,863	3,432	27,456.00	4,843	12,107	60,535.00
Kafir-corn . . . tons	9,915	4,958	39,664.00	11,285	33,855	135,420.00
Jerusalem corn . . . tons						
Timothy . . . tons						
Clover . . . tons						
Blue-grass . . . tons						
Alfalfa . . . tons	1,714	* 1,401	18,213.00	1,228	† 1,823	13,672.50
Orchard-grass . . . tons						
Other tame grasses, tons						
Prairie-grass fnc'd, tons	151,599	313	3,130.00	124,036	72	432.00
Totals	294,701		$192,774.00	295,433		$1,045,685.38

Corn on hand March 1, 1911, 10,819 bushels; March 1, 1912, 1,700 bushels.
Wheat on hand March 1, 1911, 35,967 bushels; March 1, 1912, 1130 bushels.

*** Product of 1910. † Product of 1911.**

POPULATION AND VALUATION.—THOMAS COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......	5,026	4,007	$6,560,755	$514,782	$1,332,690	$3,001,328	$11,409,505
Barrett tp.........	309	285	$616,879	$1,330	$70,240	....	$688,449
Hale tp...........	403	308	648,318	42,980	115,470	$631,209	1,437,977
Kingery tp........	325	257	821,492	....	69,590	443	891,525
Lacey tp..........	257	176	229,725	26,792	76,970	319,355	652,842
Menlo tp..........	307	236	322,962	17,855	70,470	170,592	581,879
Colby.............	1,029 } 1,361	826 } 1,068	....	382,085	417,100	114,447	913,632
Morgan tp.........	332	237	708,179	....	52,110	901,736	1,662,025
North Randall tp..	203	163	348,288	1,572	37,140	163,689	550,689
South Randall tp..	436	381	718,507	....	115,800	236,972	1,071,279
Rovohl tp.........	320	256	600,577	833	47,750	404	649,564
Smith tp..........	354	314	242,760	37,751	129,340	330,979	740,830
Summers tp.......	407	290	875,880	3,534	92,700	131,072	1,103,186
Wendell tp........	344	278	427,188	....	38,010	430	465,628

SUMMARY.—THOMAS COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops ....acres	294,701	$192,774.00	295,433	$1,045,685.38
Animals slaughtered and sold for slaughter....	....	133,981.00	....	98,201.00
Poultry and eggs sold..........................	....	29,065.00	....	15,558.00
Wool clip..................................lbs.	200	34.00	....	....
Cheese.....................................lbs.	....	....	....	....
Butter.....................................lbs.	75,316	18,075.84	51,642	12,910.50
Milk sold..	....	28,820.00	....	24,252.00
Honey and beeswax......................lbs.	105	16.65	25	8.75
Wood marketed..................................	....	100 00	....	....
Totals..	....	$402,866.49	....	$1,196,605.63

LIVE STOCK.—THOMAS COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses........................	7,203	$813,939.00	5,883	$664,779.00	188	283
Mules and asses..............	980	128,380.00	760	99,560.00	15	10
Milch cows....................	3,146	125,840.00	2,563	115,335.00	56	156
Other cattle..................	4,607	124,389.00	2,509	90,288.00	91	232
Sheep.........................	170	714.00	115	488.75	27	19
Swine.........................	2,424	24,240.00	1,165	11,650.00	137	235
Totals......................	18,530	$1,217,502.00	12,995	$972,100.75	514	935

Number of dogs in county March 1, 1911, 797; March 1, 1912, 645.

TREGO COUNTY.

Organized in 1879; area, 900 square miles; population, 4614; rank in population, 83; assessed valuation, $9,076,177; miles of railroad, main track, 32.84; county seat, Wa Keeney, population, 689.

POPULATION AND VALUATION.—TREGO COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county	5,099	4,614	$5,859,155	$453,685	$1,220,320	$1,543,017	$9,076,177
Collyer tp.	1,218	1,173	$1,481,340	$58,980	$361,625	$429,120	$2,281,065
Franklin tp.	297	223	487,715	....	49,655	262	537,682
Glencoe tp.	249	238	290,020	....	39,665	215,258	544,938
Ogallah tp.	765	717	1,069,260	18,350	133,230	304,824	1,525,664
Riverside tp.	364	354	590,595	....	73,175	289	664,059
Wa Keeney	833 } 1,851	689 } 1,550	....	372,595	317,180	68,768	758,543
Wa Keeney tp.	1,018	861	1,383,980	3,760	184,125	524,476	2,096,341
Wilcox tp.	355	359	606,245	....	61,665	25	667,935

FARM AND CROP STATISTICS.—TREGO COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	12,667	38,001	$31,920.84	31,144	249,152	$194,338.56
Spring wheat.......bu.	225	....	....	....	....	....
Corn...............bu.	72,189	72,189	51,254.19	60,878	791,414	435,277.70
Oats...............bu.	17,517	....	....	12,919	180,866	81,389.70
Rye................bu.	40	....	....	186	1,860	1,302.00
Barley.............bu.	2,687	....	....	700	11,200	4,592.00
Emmer ("speltz")..bu.	681	....	....	171	2,052	1,026.00
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	219	....	....	182	8,736	7,862.40
Sweet potatoes......bu.	....	....	....	....	....	....
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	....	....	....	70	28,000	700.00
Millet & hungarian, tons	5,107	5,107	40,856.00	2,847	7,117	35,585.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	42	1,050	525.00	50	3,250	1,625.00
forage or grain..tons	9,854	....	59,124.00	13,296	....	119,664.00
Milo maize.........tons	1,257	943	7,544.00	13,459	33,647	185,058.50
Kafir-corn.........tons	12,355	12,355	98,840.00	17,419	52,257	235,156.50
Jerusalem corn....tons	20	20	160.00	35	105	525.00
Timothy..........tons	....	* 16,774	218,062.00	....	† 2,279	18,232.00
Clover............tons	....			....		
Blue-grass........tons	....			....		
Alfalfa...........tons	4,433			3,020		
Orchard-grass.....tons	....			....		
Other tame grasses, tons	9			....		
Prairie-grass fnc'd, tons	157,601	2,489	24,890.00	173,075	1,130	6,780.00
Totals.............	296,903	....	$533,176.03	329,451	....	$1,329,114.36

Corn on hand March 1, 1911, 59,130 bushels; March 1, 1912, 500 bushels.
Wheat on hand March 1, 1911, 33,370 bushels; March 1, 1912, 200 bushels.

*** Product of 1910. † Product of 1911.**

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SUMMARY.—TREGO COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops .... acres	296,903	$533,176.03	329,451	$1,329,114.36
Animals slaughtered and sold for slaughter....	....	231,129.00	....	180,968.00
Poultry and eggs sold......................	....	42,282.00	....	32,304.00
Wool clip .... lbs.	22	8.74	4,558	911.60
Cheese............................... lbs.	....	....	....	....
Butter................................ lbs.	76,640	18,398.60	68,201	17,050.25
Milk sold	....	35,677.00	....	27,257.00
Honey and beeswax.................. lbs.	50	7.50	....	....
Wood marketed	....	250.00	....	661.00
Totals............................	....	$860,918.87	....	$1,588,266.21

LIVE STOCK.—TREGO COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	6,755	$763,315.00	6,447	$728,511.00	152	192
Mules and asses	1,030	134,930.00	865	113,815.00	7	14
Milch cows..................	6,859	274,860.00	5,224	235,080.00	19	34
Other cattle.................	12,898	348,246.00	6,902	220,864.00	160	275
Sheep	1,176	4,939.20	876	3,723.00	21	....
Swine.......................	7,460	74,600.00	3,570	35,700.00	84	453
Totals..................	36,178	$1,600,890.20	23,884	$1,337,193.00	443	968

Number of dogs in county March 1, 1911, 910; March 1, 1912, 969.

WABAUNSEE COUNTY.

Organized in 1859; area, 804 square miles; population, 12,302; rank in population, 54; assessed valuation, $23,680,059; miles of railroad, main track, 75.52; county seat, Alma, population, 890.

POPULATION AND VALUATION.—WABAUNSEE COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......	12,213	12,302	$14,296,279	$1,323,670	$4,340,475	$3,719,635	$23,680,059
Alma............	879 } 1,451	890 } 1,452	....	$397,365	$367,355	$59,525	$824,245
Alma tp..........	572	562	$763,430	....	168,020	428,052	1,359,502
Farmer tp........	310	290	837,900	....	166,955	197,292	1,202,147
Alta Vista........	443 } 892	476 } 935	....	179,870	241,955	27,922	449,747
Garfield tp........	449	459	747,055	....	208,495	312,738	1,268,288
Kaw tp...........	679	663	1,090,830	....	371,075	6,260	1,468,165
Maple Hill........	260 } 1,028	260 } 1,058	....	89,660	77,335	733	167,728
Maple Hill tp......	768	798	1,507,484	....	283,920	514,468	2,305,872

POPULATION AND VALUATION.—WABAUNSEE COUNTY.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
Mill Creek tp......		544		524	$907,625	$2,420	$157,120	$286,677	$1,353,842
Mission Creek tp..		1,066		1,059	1,339,455	....	274,380	70,035	1,683,870
McFarland........	398	1,662	459	1,790	....	101,375	46,630	959	148,964
Paxico...........	231		295		....	....	....	....	....
Newbury tp.......	1,033		1,036		1,605,190	73,845	490,810	584,352	2,754,197
Harveyville.......	284	1,080	288	1,091	....	107,690	111,200	11,599	230,489
Plumb tp.........	796		803		1,169,330	4,300	192,040	196,142	1,561,812
Rock Creek tp.....		616		621	844,415	....	172,095	1,970	1,018,480
Wabaunsee tp.....		944		956	1,628,650	23,870	411,390	524,742	2,588,652
Washington tp....		372		852	763,385	....	202,050	302,500	1,267,935
Eskridge.........	934	1,569	840	1,511	....	339,435	205,090	35,062	579,5877
Wilmington tp....	635		671		1,091,580	3,840	193,060	158,107	1,446,587

FARM AND CROP STATISTICS.—WABAUNSEE COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	9,081	163,458	$143,843.04	15,835	300,865	$252,726.60
Spring wheat.......bu.	35	525	409.50	....	....	....
Corn...............bu.	85,912	1,460,504	890,907.44	74,529	1,863,225	987,509.25
Oats...............bu.	9,907	138,698	55,479.20	4,912	152,272	59,886.08
Rye................bu.	58	928	788.80	154	3,388	2,541.00
Barley.............bu.	6	120	60.00	17	374	160.82
Emmer ("speltz")..bu.	....	....	....	15	375	168.75
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	930	35,340	35,340.00	885	74,340	50,551.20
Sweet potatoes......bu.	402	40,200	36,180.00	886	56,742	43,691.34
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	234	936	1,638.00	70	420	630.00
Tobacco...........lbs.	....	....	....	....	....	....
Broom-corn........lbs.	....	....	....	2	1,100	44.00
Millet & hungarian, tons	4,449	6,674	46,718.00	3,546	8,865	42,108.75
Sugar-beets.......tons	....	....	....	8	80	400.00
Sorghum for—						
syrup or sugar...gals.	50	5,000	2,500.00	98	9,310	4,189.50
forage or grain..tons	3,161	....	37,932.00	5,466	....	76,524.00
Milo maize........tons	62	124	744.00	40	120	600.00
Kafir-corn........tons	8,043	24,129	132,710.00	15,248	60,992	243,968.00
Jerusalem corn....tons	....	....	....	5	20	80.00
Timothy...........tons	855	* 32,174	337,827.00	652	† 17,957	161,613.00
Clover............tons	2,424			1,501		
Blue-grass........tons	1,397			1,811		
Alfalfa...........tons	14,726			15,077		
Orchard-grass.....tons	35			33		
Other tame grasses, tons	744			422		
Prairie-grass fac'd, tons	254,222	30,724	276,516.00	245,561	10,501	73,507.00
Totals............	396,733	....	$1,999,592.98	386,273	....	$2,000,399.29

Corn on hand March 1, 1911, 671,800 bushels; March 1, 1912, 294,710 bushels.
Wheat on hand March 1, 1911, 22,580 bushels; March 1, 1912, 5770 bushels.

* Product of 1910. † Product of 1911.

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SUMMARY.—WABAUNSEE COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops.........acres	396,733	$1,999,592.98	386,298	$2,000,399.29
Animals slaughtered and sold for slaughter	....	2,276,982.00	....	2,572,686.00
Poultry and eggs sold	....	139,998.00	....	129,781.00
Wool clip.........lbs.	8,042	1,367.14	8,065	1,613.00
Cheese.........lbs.	....	....	715	100.10
Butter.........lbs.	203,326	48,798.24	188,173	47,043.25
Milk sold	....	62,475.00	....	62,228.00
Honey and beeswax.........lbs.	8,154	1,224.40	4,104	635.70
Wood marketed	....	2,428.00	....	1,428.00
Totals	....	$4,532,865.76	....	$4,815,814.34

LIVE STOCK.—WABAUNSEE COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	10,497	$1,186,161.00	10,053	$1,135,989.00	227	255
Mules and asses	2,016	264,096.00	2,135	279,685.00	43	18
Milch cows	12,292	491,680.00	13,206	594,270.00	66	130
Other cattle	36,103	974,781.00	28,564	914,048.00	593	425
Sheep	8,917	37,451.40	3,344	14,212.00	18	214
Swine	26,650	266,500.00	23,025	230,250.00	448	3,006
Totals	96,475	$3,220,669.40	80,327	$3,168,454.00	1,395	4,048

Number of dogs in county March 1, 1911, 2193; March 1, 1912, 1990.
Number of sheep killed by dogs, year ending March 1, 1911, 3; March 1, 1912, 16.
Number of sheep killed by wolves, year ending March 1, 1911, 1; March 1, 1912, 18.

WALLACE COUNTY.

Organized in 1888; area, 900 square miles; population, 2058; rank in population, 99; assessed valuation, $4,886,974; miles of railroad, main track, 31.78; county seat, Sharon Springs, population, 526.

POPULATION AND VALUATION.—WALLACE COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county	2,424	2,058	$2,420,383	$212,889	$628,704	$1,624,998	$4,886,974
Harrison tp	144	114	$183,351	....	$26,398	$311	$210,060
Morton tp	437	296	368,146	....	50,207	....	418,353
North tp	96	63	183,130	....	38,004	152	221,286
Sharon Springs	420 } 788	526 } 776	....	$198,751	....	....	198,751
Sharon Springs tp	368 }	250 }	596,052	....	270,332	567,105	1,433,489
Stockholm tp	123	115	175,111	....	33,690	....	208,801
Wallace tp	423	388	494,135	12,222	135,644	437,319	1,079,320
Weskan tp	413	306	420,458	6,916	74,429	620,111	1,121,914

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FARM AND CROP STATISTICS.—WALLACE COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat........bu.	269	269	$269.00	656	2,624	$2,099.20
Spring wheat........bu.	1,515	....	....	1,191	4,764	3,602.24
Corn........bu.	13,035	52,140	36,498.00	7,341	110,115	61,664.40
Oats........bu.	792	....	....	1,159	17,385	7,475.55
Rye........bu.	133	....	....	41	369	261.99
Barley........bu.	1,663	....	....	1,582	15,820	7,119.00
Emmer ("speltz")..bu.	197	....	....	48	624	305.76
Buckwheat........bu.	....	....	....	....	....	....
Irish potatoes........bu.	202	....	....	62	4,154	3,530.90
Sweet potatoes........bu.	....	....	....	....	....	....
Castor-beans........bu.	....	....	....	....	....	....
Cotton........lbs.	....	....	....	....	....	....
Flax........bu.	....	....	....	12	48	72.00
Tobacco........lbs.	....	....	....	....	....	....
Broom-corn........lbs.	1,140	114,000	6,270.00	1,036	466,200	11,655.00
Millet & hungarian, tons	1,613	1,210	9,680.00	1,712	2,996	14,980.00
Sugar-beets........tons	....	....	....	1	5	25.00
Sorghum for—						
syrup or sugar...gals.	12	240	120.00	10	600	300.00
forage or grain..tons	5,496	....	27,480.00	5,511	....	44,088.00
Milo maize........tons	2,431	2,431	19,448.00	3,180	7,950	39,750.00
Kafir-corn........tons	1,796	1,796	14,368.00	2,817	7,042	31,689.00
Jerusalem corn....tons	50	50	400.00	68	170	765.00
Timothy........tons	....	* 3,805	49,465.00	....	† 1,652	13,216.00
Clover........tons	....			....		
Blue-grass........tons	....			....		
Alfalfa........tons	4,236			3,155		
Orchard-grass.....tons	....			....		
Other tame grasses, tons	15			....		
Prairie-grass fnc'd, tons	86,524	1,878	18,780.00	106,943	906	6,342.00
Totals........	121,119	....	$182,778.00	136,525	....	$248,941.04

Corn on hand March 1, 1911. 20,989 bushels; March 1, 1912, 1044 bushels.
Wheat on hand March 1, 1911. 1387 bushels; March 1, 1912, 108 bushels.

*** Product of 1910. † Product of 1911.**

SUMMARY.—WALLACE COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops........acres	**121,119**	**$182,778.00**	**136,525**	**$248,941.04**
Animals slaughtered and sold for slaughter....	....	**29,460.00**	....	**20,911.00**
Poultry and eggs sold........	....	**11,380.00**	....	**8,972.00**
Wool clip........lbs.	....	....	....	....
Cheese........lbs.	**267**	**34.71**	**250**	**35.00**
Butter........lbs.	**39,067**	**9,376.08**	**35,057**	**8,764.25**
Milk sold........	....	**20,984.00**	....	**15,551.00**
Honey and beeswax........lbs.	**632**	**94.80**	**50**	**7.50**
Wood marketed........	....	....	....	....
Totals........	....	**$254,107.59**	....	**$303,181.79**

LIVE STOCK.—WALLACE COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	4,356	$492,228.00	4,265	$481,945.00	49	86
Mules and asses	675	88,425.00	653	85,543.00	4	9
Milch cows	3,328	133,120.00	2,998	134,910.00	32	54
Other cattle	5,070	136,890.00	4,895	156,640.00	20	210
Sheep	1,901	7,984.20	743	3,157.75	....	....
Swine	1,250	12,500.00	752	7,520.00	14	58
Totals	16,580	$871,147.20	14,306	$869,715.75	119	417

Number of dogs in county March 1, 1911, 464; March 1, 1912, 293.
Number of sheep killed by dogs, year ending March 1, 1912, 6.

WASHINGTON COUNTY.

Organized in 1860; area, 900 square miles; population, 20,014; rank in population, 28; assessed valuation, $39,668,444; miles of railroad, main track, 106.52; county seat, Washington, population, 1666.

FARM AND CROP STATISTICS.—WASHINGTON COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	65,327	979,905	$832,919.25	51,677	775,155	$620,124.00
Spring wheat.......bu.	334	3,982	3,055.40	69	828	629.28
Corn...............bu.	150,075	2,101,050	1,176,588.00	148,146	2,814,774	1,548,125.70
Oats...............bu.	49,608	446,472	191,982.96	41,971	1,217,159	474,692.01
Rye................bu.	52	572	486.20	75	1,125	787.50
Barley.............bu.	10	160	88.00	....	....	....
Emmer ("speltz")..bu.	10	150	69.00	5	95	42.75
Buckwheat..........bu.	10	60	60.00	1	9	9.00
Irish potatoes.......bu.	1,509	34,707	32,971.65	1,179	84,888	61,968.24
Sweet potatoes......bu.	6	270	337.50	3	255	242.25
Castor-beans........bu.	....	....	....	....	....	....
Cotton..............lbs.	....	....	....	....	....	....
Flax................bu.	....	....	....	....	....	....
Tobacco.............lbs.	....	....	....	....	....	....
Broom-corn.........lbs.	30	13,500	877.50	5	2,250	90.00
Millet & hungarian, tons	4,838	9,676	67,732.00	4,898	6,122	36,732.00
Sugar-beets........tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	72	5,400	2,700.00	83	4,980	2,490.00
forage or grain..tons	1,831	....	18,810.00	3,374	....	40,488.00
Milo maize.........tons	49	98	548.00	240	600	3,000.00
Kafir-corn.........tons	2,206	6,618	33,090.00	4,866	12,165	60,825.00
Jerusalem corn....tons	....	....	....	64	160	800.00
Timothy...........tons	664	* 40,238	442,563.00	467	† 18,795	187,950.00
Clover............tons	488			235		
Blue-grass.........tons	685			463		
Alfalfa............tons	25,967			28,803		
Orchard-grass.....tons	21			....		
Other tame grasses, tons	75			94		
Prairie-grass fnc'd, tons	164,888	25,783	244,938.50	166,703	11,451	97,333.50
Totals	468,755	....	$3,049,316.96	453,421	....	$3,186,829.23

Corn on hand March 1, 1911, 1,170,413 bushels; March 1, 1912, 606,091 bushels.
Wheat on hand March 1, 1911, 68,852 bushels; March 1, 1912, 66,323 bushels.

* Product of 1910. † Product of 1911.

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POPULATION AND VALUATION.—WASHINGTON COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county		20,162		20,014	$26,058,890	$2,525,280	$7,584,140	$3,505,184	$39,668,444
Barnes	416	1,021	458	1,011	....	$178,030	$224,720	$18,844	$416,594
Barnes tp	605		553		$1,101,180	....	156,805	210,606	1,468,091
Brantford tp		627		642	1,041,700	....	238,210	....	1,279,910
Charleston tp		557		562	1,009,596	2,890	196,285	179,581	1,388,351
Clifton	310	967	334	972	....	155,290	159,115	35,540	349,945
Vining	103		97		....	27,500	47,170	61,086	135,756
Clifton tp	554		541		1,236,280	....	184,175	500,689	1,921,144
Coleman tp		585		576	869,400	3,880	164,460	1,542	1,039,282
Farmington tp		566		554	1,182,915	10,470	234,115	65,723	1,493,223
Hollenberg	154	737	157	752	1,038,510	39,310	252,715	253,075	1,633,610
Franklin tp	583		595						
Grant tp		570		584	770,010	....	150,240	3,283	923,533
Greenleaf	815	1,382	783	1,361	....	326,650	268,640	45,226	640,516
Greenleaf tp	567		578		1,106,400	....	238,915	241,798	1,587,113
Haddam	388	1,046	459	1,088	....	178,065	223,650	34,789	431,504
Haddam tp	658		629		1,102,160	....	179,845	128,681	1,410,686
Hanover	1,004	1,563	1,037	1,591	....	442,415	351,175	84,117	877,707
Hanover tp	559		554		1,092,605	....	244,060	325,767	1,662,432
Highland tp		412		390	744,100	....	109,745	1,026	854,871
Lanham	61	753	58	708	1,218,710	10,690	363,645	198,856	1,791,901
Independence tp	692		650						
Kimeo tp		598		602	882,020	....	149,700	....	1,031,720
Lincoln tp		502		508	941,875	....	181,885	907	1,124,667
Linn	307	907	276	862	....	101,970	180,230	19,412	301,612
Linn tp	600		586		1,187,150	....	212,435	225,927	1,625,512
Little Blue tp		605		561	1,019,650	....	189,750	3,045	1,212,445
Logan tp		518		477	1,061,390	....	156,480	97,370	1,315,240
Lowe tp		516		529	1,010,200	....	173,525	898	1,184,623
Morrowville	198	757	205	754	1,029,000	77,900	315,860	156,435	1,579,195
Mill Creek tp	559		549						
Sheridan tp		566		583	1,078,120	....	184,520	259,552	1,522,192
Palmer	226	810	248	836	....	79,625	175,945	33,063	288,633
Sherman tp	584		588		1,134,550	....	244,750	49,800	1,428,600
Strawberry tp		610		590	954,160	....	215,925	66	1,170,151
Mahaska	226	695	227	662	....	86,475	92,685	25,154	204,314
Union tp	469		435		1,088,240	....	188,965	91,476	1,368,671
Washington	1,652	2,292	1,666	2,259	....	809,120	773,415	35,351	1,617,886
Washington tp	640		593		1,103,970	....	160,895	121,949	1,386,814

SUMMARY.—WASHINGTON COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops ....acres	468,755	$3,049,316.96	453,421	$3,136,329.28
Animals slaughtered and sold for slaughter	....	1,932,670.00	....	1,714,845.00
Poultry and eggs sold	....	219,236.00	....	197,889.00
Wool clip ....lbs.	3,245	551.65	1,255	251.00
Cheese ....lbs.	....	....	....	....
Butter ....lbs.	349,950	83,988.00	355,995	88,998.75
Milk sold	....	151,128.00	....	159,129.00
Honey and beeswax ....lbs.	44,042	6,636.70	3,379	511.96
Wood marketed	....	1,550.00	....	1,432.00
Totals	....	$5,445,077.31	....	$5,299,885.98

LIVE STOCK.—WASHINGTON COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses	15,548	$1,756,359.00	14,447	$1,632,511.00	250	538
Mules and asses	2,981	390,511.00	2,972	389,332.00	19	27
Milch cows	13,624	544,960.00	14,668	660,060.00	123	201
Other cattle	27,774	749,898.00	22,405	716,960.00	571	911
Sheep	8,290	84,818.00	4,396	18,683.00	32	161
Swine	62,437	624,370.00	48,910	489,100.00	808	10,767
Totals	130,649	$4,100,916.00	107,798	$3,906,646.00	1,798	12,605

Number of dogs in county March 1, 1911, 3561; March 1, 1912, 3327.
Number of sheep killed by dogs, year ending March 1, 1911, 4; March 1, 1912, 18.
Number of sheep killed by wolves, year ending March 1, 1911, 1; March 1, 1912, 3.

WICHITA COUNTY.

Organized in 1886; area, 720 square miles; population, 1558; rank in population, 100; assessed valuation, $3,486,035; miles of railroad, main track, 23.92; county seat, Leoti, population, 259.

POPULATION AND VALUATION.—WICHITA COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county	1,746	1.558	$1,983.408	$106,104	$416.706	$949.817	$3.486,035
Edwards tp	645	599	$715,923	......	$118,174	$1,901	$835,998
Leoti	281 } 639	259 } 586	....	$100,050	108,692	37,750	246,492
Leoti tp	358	327	519,134	6,054	104,678	908,784	1,538,650
White Woman tp	462	373	748.351	......	120,162	1.382	869,895

FARM AND CROP STATISTICS.—WICHITA COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat ... bu.	788	788	$693.44	2,090	8,360	$6,270.00
Spring wheat ... bu.	944	....	....	1,215	4,860	3,402.00
Corn ... bu.	5,818	....	....	4,039	44,429	26,657.40
Oats ... bu.	1,621	....	....	1,405	16,860	7,249.80
Rye ... bu.	210	....	....	32	256	181.76
Barley ... bu.	6,852	....	....	4,686	37,488	18,744.00
Emmer ("speltz") ... bu.	68	....	....	....	....	....
Buckwheat ... bu.	....	....	....	....	....	....
Irish potatoes ... bu.	27	....	....	65	2,600	2,340.00
Sweet potatoes ... bu.	....	....	....	1	50	50.00
Castor-beans ... bu.	....	....	....	....	....	....
Cotton ... lbs.	....	....	....	....	....	....
Flax ... bu.	....	....	....	....	....	....

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FARM AND CROP STATISTICS.—WICHITA COUNTY.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn........lbs.	400	60,000	$3,300.00	360	144,000	$3,600.00
Millet & hungarian, tons	1,305	653	5,224.00	797	1,394	6,970.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	....	....	....	47	2,585	1,292.50
forage or grain..tons	8,605	....	51,630.00	8,402	....	67,216.00
Milo maize........tons	3,267	3,267	26,136.00	3,328	8,320	41,600.00
Kafir-corn.........tons	1,820	1,820	14,560.00	2,097	4,194	20,970.00
Jerusalem corn....tons	51	51	408.00	10	20	100 00
Timothy..........tons	....			....		
Clover............tons	....			....		
Blue-grass........tons	....	* 799	10,387.00	....	† 756	6,426.00
Alfalfa...........tons	692			617		
Orchard-grass.....tons	....			....		
Other tame grasses, tons	....			....		
Prairie-grass fnc'd, tons	102,908	507	5,070.00	145,113	308	1,848.00
Totals..............	135,376	....	$117,408.44	174,304	....	$214,917.46

Corn on hand March 1, 1911, 1440 bushels.
Wheat on hand March 1, 1911, 1303 bushels.
*** Product of 1910. † Product of 1911.**

SUMMARY.—WICHITA COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops..........................acres	135,376	$117,408.44	174,304	$214,917.46
Animals slaughtered and sold for slaughter....	....	12,123.00	....	12,164.00
Poultry and eggs sold....................	....	12,828.00	....	9,412.00
Wool clip.................................lbs.	16,540	2,811.80	12,500	2,500.00
Cheese....................................lbs.	25	3.25	50	7.00
Butter....................................lbs.	37,086	8,900.64	23,616	5,904.00
Milk sold................................	....	13,492.00	....	13,648.00
Honey and beeswax.........................lbs.	....	....	....	....
Wood marketed............................	....	....	....	1,450.00
Totals...................................	....	$167,567.13	....	$260,902.46

LIVE STOCK.—WICHITA COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number	Value.	Number.	Value.	1911.	1912.
Horses......................	3,078	$347,814.00	3,064	$346,232.00	18	10
Mules and asses.............	358	46,898.00	343	44,938.00	1	2
Milch cows..................	2,044	81,760.00	2,074	93,330.00	5	22
Other cattle................	4,550	122,850.00	3,898	124,736.00	43	38
Sheep.......................	2,500	10,500.00	2,356	10,013.00	....	....
Swine.......................	750	7,500.00	475	4,750.00	4	5
Totals......................	13,280	$617,322.00	12,210	$623,994.00	71	77

Number of dogs in county March 1, 1911, 387; March 1, 1912, 305.
Number of sheep killed by dogs, year ending March 1, 1911, 2.

WILSON COUNTY.

Organized in 1865; area, 576 square miles; population, 19,088; rank in population, 31; assessed valuation, $31,550,629; miles of railroad, main track, 119.37; county seat, Fredonia, population, 3051.

POPULATION AND VALUATION.—WILSON COUNTY.

Table showing total population by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county		19,393		19,088	$11,491,295	$3,523,670	$6.028,020	$10,507,644	$31,550,629
Altoona	1,550	2,485	1,482	2,353	....	$422,900	$209,185	$50,240	$682,325
Cedar tp.	935		871		$869,270	....	278,665	1,936,930	3,084,865
Fredonia	3,179	4,162	3,051	3,984	....	1,374,505	914,295	110,235	2.399,035
Center tp.	983		933		1,208,130	....	332,830	874,270	2,415,230
Chetopa tp.		650		654	546,840	....	154,745	329,480	1,031,065
Buffalo	757	1,373	740	1,388	....	215,520	126,005	30,680	372,205
Clifton tp.	616		648		648,485	....	167,690	412,060	1,228,235
Colfax tp.		797		771	851,915	....	344,790	922,020	2,118,725
Duck Creek tp.		491		489	484,260	....	107,780	250,345	842,385
New Albany	231	1,091	223	1,047	....	62,625	53,560	28,710	144,895
Fall River tp.	860		824		830,230	....	285,365	272,480	1,388,075
Benedict	215	768	227	717	....	63,725	74,485	24,540	162,750
Guilford tp.	553		490		831,405	....	194,515	640,440	1,666,360
Neodesha	2,617	4,008	2,756	4,167	....	1,334,900	658,745	107,700	2,101,345
Neodesha tp.	1,391		1,411		1,753,150	....	1,185,805	2,541,474	5,480,429
Newark tp.		768		770	524,680	....	171,670	365,210	1,061,560
Pleasant Valley tp.		801		814	938,430	....	245,890	500,345	1,684,665
Prairie tp.		398		393	506,760	....	86,325	504,040	1,097,125
Talleyrand tp.		609		576	583,285	....	184,245	221,705	987,235
Coyville	200	595	144	583	....	49,495	68,575	29,675	147,745
Verdigris tp.	395		439		471,795	....	91,175	237,010	799,980
Webster tp.		397		382	442,660	....	91,680	118,055	652,395

FARM AND CROP STATISTICS.—WILSON COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat......bu.	8,033	144,594	$122,904.90	15,181	302,620	$272,358.00
Spring wheat......bu.	17	255	204.00	....	....	....
Corn ....bu.	63,326	1,076,525	592,088.75	60,824	844,536	464,494.80
Oats ....bu.	15,283	229,245	96,282.90	5,602	196,070	78,428.00
Rye ....bu.	167	2,171	1,736.80	813	5,634	4,225.50
Barley ....bu.	....	....	....	....	....	....
Emmer ("speltz")..bu.	12	240	110.40	....	....	....
Buckwheat ....bu.	....	....	....	....	....	....
Irish potatoes.......bu.	751	12,016	12,616.80	503	25,150	20,120.00
Sweet potatoes......bu.	3	78	101.40	7	420	420.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton ....lbs.	....	....	....	....	....	....
Flax ....bu.	11,550	34,650	62,370.00	3,952	23,712	35,568.00
Tobacco............lbs.	....	....	....	....	....	....
Broom-corn ....lbs.	30	13,500	877.50	59	29,500	1,180.00
Millet & hungarian, tons	236	354	2,301.00	546	819	4,914.00
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	193	15,440	6,948.00	219	16,425	8,212.50
forage or grain..tons	2,298	....	20,682.00	4,513	....	45,130.00
Milo maize........tons	10	20	120.00	44	132	660.00
Kafir-corn ....tons	14,331	42,993	214,965.00	28,293	84,879	381,955 50
Jerusalem corn....tons	2	6	30.00	12	36	162.00

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FARM AND CROP STATISTICS.—WILSON COUNTY.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Timothy ....tons	4,969	* 12,573	$125,730.00	1,228	† 8,639	$86,390.00
Clover ....tons	6,677			1,514		
Blue-grass ....tons	1,277			784		
Alfalfa ....tons	4,174			6,310		
Orchard-grass ....tons	49			......		
Other tame grasses, tons	801			141		
Prairie-grass fnc'd, tons	111,358	30,599	244,792.00	124,110	28,219	211,642.50
Totals............	245,541	....	$1,504,861.45	523,600	....	$1,615,860.80

Corn on hand March 1, 1911, 206,032 bushels; March 1, 1912, 216,028 bushels.
Wheat on hand March 1, 1911, 11,597 bushels; March 1, 1912, 13,060 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—WILSON COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops...........................acres	245,541	$1,504,861.45	253,600	$1,615,860.80
Animals slaughtered and sold for slaughter....	....	643,244.00	....	535,772.00
Poultry and eggs sold......................	....	127,057 00	....	119,863.00
Wool clip...............................lbs.	3,962	673.54	3,205	641.00
Cheese..................................lbs.	150	19.50	1,965	277.90
Butter..................................lbs.	369,346	88,643.04	366,087	91,521.75
Milk sold..................................	....	16,994.00	....	21,484.00
Honey and beeswax.......................lbs.	7,141	1,118.15	3,715	557.25
Wood marketed..............................	....	120.00	....	58.00
Totals.....................................	....	$2,382,730.68	....	$2,386,035.70

LIVE STOCK.—WILSON COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses......................	9,666	$1,092,258.00	9,802	$1,107,626.00	283	225
Mules and asses.............	2,412	315,972.00	2,702	353,962.00	33	20
Milch cows..................	7,463	298,520.00	8,834	397,580 00	165	146
Other cattle................	14,221	383,967.00	12,583	402,656.00	391	302
Sheep.......................	1,918	8,055.60	1,370	5,822 50	4	1
Swine.......................	22,112	221,120.00	19,580	195,800.00	375	1,655
Totals..................	57,792	$2,319,892.60	54,871	$2,463,396.50	1,251	2,349

Number of dogs in county March 1, 1911, 2485; March 1, 1912, 2442.
Number of sheep killed by dogs, year ending March 1, 1911, 9.

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WOODSON COUNTY.

Organized in 1855; area, 504 square miles; population, 10,120; rank in population, 66; assessed valuation, $14,862,340; miles of railroad, main track, 89.01; county seat, Yates Center, population, 2274.

POPULATION AND VALUATION.—WOODSON COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......	10,106	10,120	$7,630,410	$1,627,770	$2,261,545	$3,342,615	$14,862,340
Belmont tp.......	581	585	$518,475	....	$123,965	$1,129	$643,559
Yates Center.....	2,269 } 2,983	2,274 } 2,981	....	$1,275,330	542,405	150,285	1,968,020
Center tp.........	714	710	977,435	....	172,065	814,904	1,964,404
Eminence tp......	557	557	648,815	....	147,120	358,873	1,149,308
Everett tp.........	725	725	840,030	....	103,640	744,876	1,688,546
Liberty tp.........	716	746	889,860	....	141,905	3,196	1,034,961
Neosho Falls......	566 } 1,347	604 } 1,360	....	154,515	109,960	32,084	296,559
Neosho Falls tp...	781	756	600,575	....	164,925	532,115	1,297,615
North tp..........	462	460	882,745	....	132,815	....	1,015,560
Owl Creek tp......	701	713	751,365	....	139,670	192,023	1,083,058
Perry tp..........	494	494	520,980	....	93,120	8,565	622,665
Toronto..........	757 } 1,540	743 } 1,496	....	197,925	170,360	65,787	434,072
Toronto tp........	783	753	1,000,130	....	219,605	444,278	1,664,013

FARM AND CROP STATISTICS.—WOODSON COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	2,878	60,338	$53,696.37	5,276	89,692	$76,238.20
Spring wheat.......bu.	....	....	....	....	....	....
Corn...............bu.	40,630	650,080	364,044.80	36,617	659,106	369,099.36
Oats...............bu.	12,146	145,752	59,758.32	4,179	117,012	46,804.80
Rye................bu.	104	1,352	1,149.20	115	1,725	1,293.75
Barley.............bu.	....	....	....	....	....	....
Emmer ("speltz")..bu.	....	....	....	....	....	....
Buckwheat.........bu.	....	....	....	....	....	....
Irish potatoes......bu.	678	16,272	15,946.56	513	42,579	34,063.20
Sweet potatoes.....bu.	35	1,330	1,662.50	6	528	528.00
Castor-beans........bu.	....	....	....	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	1,436	4,308	7,754.40	96	576	864.00
Tobacco...........lbs.	....	....	....	1	700	70.00
Broom-corn........lbs.	29	14,500	942.50	24	12,000	480.00
Millet & hungarian, tons	272	544	3,536.00	706	1,059	5,559.75
Sugar-beets.......tons	....	....	....	....	....	....
Sorghum for—						
syrup or sugar...gals.	214	14,980	7,190.40	420	29,400	13,524.00
forage or grain..tons	2,119	....	21,190.00	3,362	....	36,982.00
Milo maize........tons	81	203	1,218.00	319	957	4,785.00
Kafir-corn........tons	12,198	48,792	268,356.00	18,229	54,687	273,435.00
Jerusalem corn....tons	....	....	....	23	69	345.00
Timothy..........tons	2,113	* 5,152	56,672.00	1,110	† 3,267	32,670.00
Clover............tons	3,256			1,322		
Blue-grass........tons	873			441		
Alfalfa...........tons	1,544			1,985		
Orchard-grass.....tons	3			6		
Other tame grasses, tons	368			55		
Prairie-grass fnc'd, tons	150,162	52,791	475,119.00	154,352	47,027	376,216.00
Totals.............	231,134	....	$1,338,236.05	229,157	....	$1,272,958.06

Corn on hand March 1, 1911, 70,222 bushels; March 1, 1912, 70,832 bushels.
Wheat on hand March 1, 1911, 125 bushels; March 1, 1912, 4946 bushels.

* Product of 1910. † Product of 1911.

SUMMARY.—WOODSON COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops .... acres	231,134	$1,338,236.05	229,157	$1,272,958.06
Animals slaughtered and sold for slaughter....	....	438,090.00	....	429,469.00
Poultry and eggs sold..........	....	98,280.00	....	80,339.00
Wool clip............ lbs.	6,003	1,020.51	4,448	889.60
Cheese............ lbs.	325	42.25	700	98.00
Butter............ lbs.	215,436	51,704.64	192,541	48,135.25
Milk sold............	....	16,944.00	....	21,185.00
Honey and beeswax............ lbs.	3,521	534.55	851	128 65
Wood marketed............	....	1,374.00	....	355.00
Totals............	....	$1,946,226.00	....	$1,853,557.56

LIVE STOCK.—WOODSON COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses............	5,490	$620,370.00	5,584	$680,992.00	184	133
Mules and asses............	1,572	205,932.00	1,726	226,106.00	10	18
Milch cows............	5,569	222,760.00	6,003	270,135.00	128	79
Other cattle............	10,949	295,623.00	10,435	333,920.00	135	192
Sheep............	955	4,011.00	1,341	5,699.25	....	15
Swine............	11,718	117,180.00	11,216	112,160.00	139	207
Totals............	36,253	$1,465,876 00	36,305	$1,579,012.25	596	644

Number of dogs in county March 1, 1911, 1437; March 1, 1912, 1235.

WYANDOTTE COUNTY.

Organized in 1859; area, 153 square miles; population, 104,714; rank in population, 1; assessed valuation, $112,839,024; miles of railroad, main track, 85.69; county seat, Kansas City, population, 86,826.

POPULATION AND VALUATION.—WYANDOTTE COUNTY.

Table showing total population, by townships and cities, for 1911 and 1912, and the assessed valuation of the municipal townships and cities for 1912.

Townships (and cities).	Population.				Assessed valuation of property.				
	1911.		1912.		Land.	City lots.	Personal.	Railroad, etc.	Total.
The county.......		104,126		104,714	$10,052,490	$65,188,734	$20,892,465	$16,705,335	$112,839,024
Bonner Springs...	1,400	3,650	1,200	2,985	$1,524,410	$575,605	$434,300	$985,040	$3,519,355
Edwardsville.....	250		200						
Delaware tp.......	2,000		1,585						
Prairie tp.........		1,303		1,011	1,070,380	35,825	163,120	622,585	1,891,910
Quindaro tp.......		2,201		2,098	3,044,950	439,575	164,070	1,188,225	4,836,820
Shawnee tp........		4,030		4,534	2,789,440	410,570	383,030	2,252,380	5,835,420

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POPULATION AND VALUATION.—WYANDOTTE COUNTY.

Townships (and cities).	Population.		Assessed valuation of property.				
	1911.	1912.	Land.	City lots.	Personal.	Railroad, etc.	Total.
Wyandotte tp.....	1,600	1,492	$1,623,310	$141,280	$162,430	$1,049,195	$2,976,215
Rosedale..........	5,663	5,768	....	3,251,700	486,950	838,450	4,577,100
Kansas City:							
1st ward.......	2,884 } 85,679	3,901 } 86,826	....	60,334,179	19,098,565	9,769,460	89,202,204
2d ward........	10,646	9,575					
3d ward........	20,553	22,931					
4th ward.......	13,775	12,452					
5th ward.......	19,564	18,676					
6th ward.......	11,105	12,486					
7th ward.......	7,152	6,805					

FARM AND CROP STATISTICS.—WYANDOTTE COUNTY.

Table showing acres, product and value of field crops in the county for 1911 and 1912.

Crops.	1911.			1912.		
	Acres.	Product.	Value.	Acres.	Product.	Value.
Winter wheat.......bu.	9,248	184,960	$166,464.00	10,430	229,460	$215,692.40
Spring wheat.......bu.	25	375	300.00	....	....	....
Corn...............bu.	7,521	135,378	87,995.70	7,184	287,360	178,163.20
Oats...............bu.	2,407	24,070	10,831.50	1,372	53,508	22,473.36
Rye................bu.	....	....	....	19	475	356.25
Barley.............bu.	....	....	....	....	....	....
Emmer ("speltz")..bu.	....	....	....	....	....	....
Buckwheat..........bu.	....	....	....	....	....	....
Irish potatoes.......bu.	7,279	414,903	365,114.64	1,255	171,935	111,757.75
Sweet potatoes......bu.	271	27,913	27,913.00	237	35,550	31,995.00
Castor-beans........bu.	2	20	25.00	....	....	....
Cotton.............lbs.	....	....	....	....	....	....
Flax...............bu.	....	....	....	....	....	....
Tobacco............lbs.	....	....	....	2	3,000	300.00
Broom-corn.........lbs.	....	....	....	....	....	....
Millet & hungarian, tons	23	46	322.00	8	18	108.00
Sugar-beets.......tons	....	....	....	1	10	50.00
Sorghum for—						
syrup or sugar...gals.	....	....	....	5	400	200.00
forage or grain..tons	16	....	288.00	46	....	828.00
Milo maize........tons	....	....	....	....	....	....
Kafir-corn........tons	8	32	192.00	47	188	940.00
Jerusalem corn....tons	....	....	....	....	....	....
Timothy..........tons	2,036	* 5,216	73,024.00	1,338	† 1,617	19,404.00
Clover...........tons	2,124			761		
Blue-grass........tons	1,428			1,878		
Alfalfa...........tons	873			1,140		
Orchard-grass.....tons	33			128		
Other tame grasses, tons	38			312		
Prairie-grass fnc'd, tons	13,024	86	860.00	11,583	111	1,110.00
Totals.............	46,356	....	$733,329.84	37,746	....	$583,377.96

Corn on hand March 1, 1911, 47,455 bushels; March 1, 1912, 6460 bushels.
Wheat on hand March 1, 1911, 28,340 bushels; March 1, 1912, 14,230 bushels.

*** Product of 1910. † Product of 1911.**

SUMMARY.—WYANDOTTE COUNTY.

Showing quantity and value of farm products in the county for 1911 and 1912.

Products.	1911.		1912.	
	Quantity.	Value.	Quantity.	Value.
Field crops .... acres	46,356	$733,329.84	37,746	$583,877.96
Animals slaughtered and sold for slaughter....	....	104,369.00	....	72,991.00
Poultry and eggs sold........	....	34,561.00	....	25,844.00
Wool clip........ lbs.	1,300	221.00	300	60.00
Cheese........ lbs.	....	....	....	....
Butter........ lbs.	397,273	118,845.52	206,799	55,899.75
Milk sold........	....	221,782.00	....	140,107.00
Honey and beeswax........ lbs.	2,778	433.20	1,323	198.45
Wood marketed........	....	450.00	....	384.00
Totals........	....	$1,208,441.56	....	$878,862.16

LIVE STOCK.—WYANDOTTE COUNTY.

Table showing number, value and mortality of live stock in the county for 1911 and 1912.

Live stock.	1911.		1912.		Mortality.	
	Number.	Value.	Number.	Value.	1911.	1912.
Horses........	5,067	$572,571.00	5,265	$594,945.00	63	95
Mules and asses........	1,126	147,506.00	1,034	135,454.00	5	5
Milch cows........	3,307	132,280.00	3,320	149,400.00	26	67
Other cattle........	1,165	31,455.00	963	30,816.00	64	56
Sheep........	1,072	4,502.40	2,605	11,071.25	....	6
Swine........	3,511	35,110.00	2,581	25,810.00	79	890
Totals........	15,248	$923,424.40	15,768	$947,496.25	237	1,119

Number of dogs in county March 1, 1911, 957; March 1, 1912, 887.

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FIELD-CROP STATISTICS.

TABLE showing the total number of acres in field crops and the aggregate value of their productions, for the state, and each county, in 1911 and 1912.

COUNTIES.	1911.		1912.	
	Acres.*	Value.	Acres.*	Value.
The State	33,402,415	$172,837,238.22	33,175,757	$227,834,650.04
Allen	241,245	$1,663,605.58	229,912	$1,729,559.30
Anderson	268,320	1,508,404.64	260,458	1,520,576.77
Atchison	229,552	2,259,486.25	205,941	2,478,318.46
Barber	496,192	1,759,745.78	472,305	2,186,118.51
Barton	456,711	3,259,823.86	458,756	3,600,427.04
Bourbon	282,900	1,828,118.91	269,212	1,861,807.37
Brown	306,776	3,556,259.38	292,607	4,031,107.29
Butler	627,610	3,686,106.90	574,108	4,093,631.34
Chase	339,716	1,147,674.62	341,747	1,458,488.67
Chautauqua	243,135	1,117,696.57	265,229	800,238.98
Cherokee	230,079	1,579,909.67	222,701	1,175,323.96
Cheyenne	262,272	225,678.10	275,518	1,361,128.63
Clark	469,085	1,207,631.80	408,006	1,605,444.14
Clay	335,367	2,527,848.06	327,969	2,407,148.16
Cloud	354,957	3,072,389.88	367,709	3,539,391.24
Coffey	281,192	1,972,102.09	302,553	2,185,131.10
Comanche	379,260	1,016,284.25	380,350	1,705,709.20
Cowley	515,550	2,780,218.19	514,328	3,134,273.79
Crawford	250,458	1,545,924.55	235,037	1,337,316.22
Decatur	439,303	644,111.60	363,876	1,324,975.33
Dickinson	455,338	3,363,442.60	431,324	3,417,387.29
Doniphan	164,160	2,131,783.20	176,878	2,402,674.02
Douglas	220,862	1,858,196.52	208,349	2,476,349.60
Edwards	258,812	1,769,876.72	298,444	2,443,537 21
Elk	288,819	960,805.45	224,573	976,286.72
Ellis	366,221	465,648.32	450,059	2,447,006.80
Ellsworth	384,841	1,306,897.13	392,079	2,622,784.03
Finney	201,046	859,149.39	241,278	960,932 48
Ford	444,281	1,868,178.34	445,603	3,628,334.17
Franklin	295,596	1,608,972 57	284,287	1,976,344.61
Geary	192,458	1,137,896.84	191,040	1,064,301.86
Gove	283,797	436,161.00	287,928	1,113,742.22
Graham	4'8.463	693,725.25	408,261	1,751,938.09
Grant	74.450	144,434.60	73,321	189,161.35
Gray	148,994	586,145.20	153,817	840,137.66
Greeley	91,731	65,514.00	64,394	119,136.31
Greenwood	500,247	2,001,204.29	487,949	2,184,921.10
Hamilton	93,434	230,521.85	71,467	250,424.74
Harper	413,053	2,439,246 42	398,232	2,832,986.62
Harvey	283,838	2,741,495.09	280,846	2,862,941.24
Haskell	69,830	119,678.44	44,399	236,457.43
Hodgeman	354,584	500,677.36	356,024	1,112,319.86
Jackson	290,007	1,896,725.88	334,994	3,181,787.70
Jefferson	283,806	2,257,757.33	282,889	2,920,185.78
Jewell	498,022	2,991,249.78	475.458	4,359,807.81
Johnson	243.141	1,875,709.75	231,877	2,755,322.04
Kearny	96,210	409,248.11	79,966	481,999.30
Kingman	438,810	2,604,402 32	428,089	3,328,400.80
Kiowa	406,741	2,506,213.23	430,014	3,138,975.44
Labette	310,774	1,980,917.04	307,130	1,755,685.60
Lane	220,117	350,426.48	248,375	553,122.45
Leavenworth	215,227	1,676,733.06	209,278	2,318,497.24
Lincoln	359,518	1,281,621.84	366,056	2,900,630.64
Linn	275,978	1,429,799 38	248,172	1,649,043.79
Logan	273,186	343,822.00	291,618	712,129.85
Lyon	397,189	2,718,963.48	365,659	2,812,862.79
Marion	451,117	3,598,077.16	448,149	3,552,270.88
Marshall	493,349	3,057,635.04	485,174	3,346,744.63
McPherson	461,776	3,461,319.30	468,550	3,583,806.43

FIELD-CROP STATISTICS—CONTINUED.

COUNTIES.	1911.		1912.	
	Acres.*	Value.	Acres.*	Value.
Meade	272,592	$1,058,952.45	333,600	$1,860,428.64
Miami	293,979	1,715,022.08	290,844	2,265,875.99
Mitchell	352,304	1,696,462.19	370,496	3,722,266.93
Montgomery	223,306	1,577,728.03	199,065	1,465,587.70
Morris	301,766	1,511,266.40	279,434	1,667,010.67
Morton	66,300	252,550.70	69,712	250,081.55
Nemaha	376,506	2,452,235.46	387,208	2,999,449.79
Neosho	261,868	1,678,709 50	250,077	1,523,254.01
Ness	394,644	573,566.97	325,332	1,239,357.05
Norton	403,395	1,023,821.70	387,757	1,892,440.15
Osage	318,795	1,937,315.68	293,397	2,057,818.22
Osborne	464,484	909,313.44	452,390	3,149,924 28
Ottawa	356,362	2,258,005.65	318,173	2,478,597.85
Pawnee	395,889	2,560,458.13	378,806	2,824,087.50
Phillips	458,590	1,566,567.33	454,241	3,084,666.31
Pottawatomie	390,874	2,532,989.72	372,415	2,733,285.93
Pratt	358,102	2,402,159.50	376,097	3,327,337.53
Rawlins	350,389	385,270.49	411,174	1,343,387.60
Reno	582,983	4,620,646.82	606,042	6,015,773.22
Republic	386,957	2,589,315.29	379,562	3,586,664.82
Rice	381,658	2,631,989.72	384,813	3,522,506.42
Riley	292,125	1,854,191.06	275,336	1,896,089.08
Rooks	425,841	961,704.64	435,461	3,331,392.40
Rush	324,430	1,031,857 40	374,280	2,284,578.82
Russell	428,190	708,956.98	444,436	2,779,225.94
Saline	337,899	2,642,203.28	350,072	2,830,536.90
Scott	176,055	366,950.00	147,744	419,547.70
Sedgwick	518,032	3,835,723.86	496,113	5,815,657 99
Seward	148,286	660,184.65	158,068	1,009,774.86
Shawnee	213,456	2,100,746.11	211,479	2,044,051.46
Sheridan	268,551	302,724.00	293,204	951,178.50
Sherman	299,415	140,045.00	256,408	730,780.02
Smith	477,855	2,283,385.50	474,016	4,615,319.41
Stafford	374,503	3,301,922.43	408,347	3,757,632.56
Stanton	40,764	90,522.75	47,468	161,652.63
Stevens	137,818	701,708.28	131,579	546,790.96
Sumner	601,271	4,181,245.87	624,934	6,021,503.04
Thomas	294,701	192,774.00	295,438	1,045,685.38
Trego	296,903	533,176.03	329,451	1,329,114.86
Wabaunsee	396,783	1,999,592.98	386,273	2,000,399.29
Wallace	121,119	182,778.00	136,525	248,941.04
Washington	468,755	3,049,816.96	453,421	3,136,829.23
Wichita	135,376	117,408.44	174,304	214,917.46
Wilson	245,541	1,504,861.45	253,600	1,615,860.80
Woodson	231,134	1,338,236 05	229,157	1,272,958.06
Wyandotte	46,356	733,329.84	37,746	583,377.96

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* Includes fenced prairie for meadow and pasture, aggregating 14,423,730 acres in 1911 and 14,051,336 acres in 1912; the only product from this included in the "value" is that of prairie-hay harvested from it, being worth $9,854,642 in 1911 and $6,583,506.50 in 1912.

ASSESSED VALUATION.

Table showing the actual value of the taxable property in the state of Kansas, as determined by the State Tax Commission, for the year 1912.

Counties.	Aggregate value of all land taxable.	Aggregate value of all town lots taxable.	Valuation of personal property.	Valuation of railroad, Pullman, telegraph, telephone and pipe-line property.	Total valuation of all property.
The State	$1,358,118,313	$440,221,647	$517,850,939	$431,209,892	$2,746,900,291
Allen	$11,531,835	$5,220,530	$5,871,785	$7,300,147	$29,924,297
Anderson	11,017,900	1,908,910	3,859,050	6,824,827	23,610,687
Atchison	16,159,557	7,946,489	11,678,621	4,753,779	40,538,446
Barber	9,572,050	1,470,345	4,365,230	3,841,950	19,249,575
Barton	25,274,700	5,053,950	7,876,940	4,143,186	42,348,776
Bourbon	12,662,871	5,530,142	6,626,642	5,266,288	30,085,943
Brown	23,981,835	4,213,170	8,267,880	4,125,290	40,588,175
Butler	27,347,974	3,214,463	8,888,481	8,114,543	47,565,461
Chase	11,327,429	1,075,840	3,054,710	3,456,830	18,914,809
Chautauqua	6,035,390	1,068,105	3,377,905	3,154,948	13,636,348
Cherokee	12,551,417	4,654,042	5,030,435	6,184,024	28,419,918
Cheyenne	4,114,100	184,300	1,079,917	564,127	5,942,444
Clark	6,474,896	794,267	2,818,834	1,544,251	11,632,248
Clay	16,691,853	2,806,808	6,233,786	3,359,015	29,091,462
Cloud	18,708,783	4,287,660	6,363,585	4,534,628	33,894,656
Coffey	12,622,014	1,942,834	4,400,080	4,096,782	23,061,710
Comanche	6,121,802	594,735	2,223,515	1,055,132	9,995,184
Cowley	20,779,341	9,822,453	9,857,455	9,305,338	49,764,587
Crawford	15,047,710	10,675,035	7,324,905	9,223,484	42,271,134
Decatur	6,236,680	899,760	1,682,530	1,996,938	10,815,908
Dickinson	21,389,838	5,480,014	7,805,948	7,038,637	41,714,437
Doniphan	14,082,606	1,521,113	5,581,530	3,337,461	24,522,710
Douglas	13,913,511	9,110,819	7,461,330	4,600,091	35,085,751
Edwards	9,358,557	1,203,838	2,949,664	1,803,283	15,315,342
Elk	6,985,950	1,130,170	2,847,190	2,884,357	13,847,667
Ellis	11,453,440	1,649,197	3,612,983	1,669,950	18,385,570
Ellsworth	14,373,402	2,055,000	5,337,460	3,392,799	25,158,661
Finney	7,093,882	1,779,789	1,931,415	1,808,886	12,613,972
Ford	10,890,258	2,015,201	3,883,931	3,998,391	20,787,781
Franklin	14,972,910	5,248,315	5,119,905	7,010,799	32,351,929
Geary	7,208,525	3,943,225	3,801,840	2,208,947	17,162,537
Gove	5,731,990	266,919	1,224,901	1,750,381	8,974,191
Graham	7,824,247	559,068	1,711,077	868,839	10,963,231
Grant	1,645,190	19,960	272,272	....	1,937,422
Gray	5,236,672	258,749	826,103	1,370,913	7,692,437
Greeley	2,156,816	65,640	317,960	1,058,631	3,599,047
Greenwood	18,408,378	2,225,485	6,696,640	5,759,952	33,090,455
Hamilton	2,428,895	378,570	697,797	1,723,928	5,229,190
Harper	16,560,446	2,776,695	4,677,986	4,926,185	28,941,312
Harvey	16,773,279	5,878,823	7,311,988	5,424,240	35,388,330
Haskell	2,672,161	30,955	257,944	805	2,961,865
Hodgeman	4,604,515	178,259	1,021,225	645,746	6,449,745
Jackson	16,631,653	2,854,931	5,701,003	3,422,537	28,610,124
Jefferson	18,068,480	1,782,990	5,702,780	4,712,058	30,266,308
Jewell	24,575,735	2,365,100	7,537,145	3,082,020	37,560,000
Johnson	20,240,120	4,437,970	4,270,335	8,043,955	36,992,380
Kearny	2,838,145	195,828	715,147	1,422,560	5,171,680
Kingman	17,164,819	1,911,071	5,338,015	4,865,215	29,279,120
Kiowa	9,982,528	993,265	2,608,851	1,927,884	15,512,528
Labette	11,600,149	9,625,921	5,815,776	8,339,849	35,381,695
Lane	3,080,366	195,508	935,890	1,752,392	5,964,156
Leavenworth	13,979,380	11,684,515	7,862,270	8,694,894	42,221,059
Lincoln	14,427,690	1,811,655	4,637,885	1,277,211	21,654,441
Linn	11,387,815	1,490,205	3,502,100	3,279,465	19,659,585
Logan	3,951,804	392,692	1,121,905	2,177,414	7,643,815
Lyon	17,913,848	8,178,821	7,896,225	6,300,895	39,789,289

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ASSESSED VALUATION—CONCLUDED

COUNTIES.	Aggregate value of all land taxable.	Aggragate value of all town lots taxable.	Valuation of personal property.	Valuation of railroad, Pullman, telegraph, telephone, and pipe-line property.	Total valuation of all property.
Marion	$23,035,786	$2,884,862	$6,901,333	$6,882,576	$39,704,557
Marshall	27,809,856	4,451,350	9,444,033	5,077,526	46,782,765
McPherson	25,554,657	4,616,017	8,981,156	4,829,752	43,981,582
Meade	5,598,349	518,352	1,911,116	1,504,389	9,532,206
Miami	15,769,595	2,961,885	5,412,363	5,245,679	29,389,522
Mitchell	17,709,766	2,513,545	5,749,780	1,711,908	27,684,999
Montgomery	14,531,911	15,812,886	11,140,369	17,950,296	59,435,462
Morris	12,043,880	1,652,078	3,765,916	4,340,128	21,802,002
Morton	1,890,231	8,870	339,438	128	2,238,177
Nemaha	26,030,822	2,772,925	7,989,662	8,373,247	40,166,656
Neosho	11,869,720	5,538,875	5,326,055	6,837,713	29,572,363
Ness	5,498,303	352,763	1,568,170	2,711,427	10,130,663
Norton	8,996,820	1,408,125	2,777,320	3,143,927	16,326,192
Osage	17,025,914	2,559,753	4,887,410	7,032,757	31,505,834
Osborne	15,227,800	2,274,155	5,164,070	1,376,225	24,042,250
Ottawa	16,653,775	2,244,883	5,102,250	2,907,806	26,908,714
Pawnee	15,249,177	2,408,850	3,937,068	2,313,585	23,908,680
Phillips	12,569,727	1,759,967	4,236,181	2,910,438	21,476,318
Pottawatomie	18,130,480	2,302,971	6,116,421	3,758,600	30,308,472
Pratt	16,012,072	2,232,489	4,122,573	3,533,075	25,900,209
Rawlins	5,104,555	324,000	1,208,771	964,241	7,601,567
Reno	37,997,883	14,980,255	15,103,870	8,608,197	76,690,215
Republic	21,987,225	2,185,455	6,511,862	5,647,857	36,332,399
Rice	20,070,662	2,698,803	6,443,480	5,652,510	34,865,455
Riley	18,125,220	4,975,865	6,183,080	4,282,298	28,566,463
Rooks	12,624,880	1,518,740	3,499,390	1,389,891	19,032,901
Rush	10,337,509	770,171	2,572,478	2,268,785	15,948,943
Russell	15,471,540	1,866,268	4,937,365	2,384,833	24,660,006
Saline	16,975,150	8,655,777	9,420,989	6,613,918	41,665,834
Scott	3,129,125	277,280	700,775	1,693,555	5,800,735
Sedgwick	32,798,021	48,488,315	19,622,247	13,201,950	114,110,533
Seward	3,168,112	694,429	1,281,895	1,480,126	6,624,562
Shawnee	18,760,335	35,579,270	17,750,710	11,515,474	83,605,789
Sheridan	5,553,271	250,600	1,274,460	1,522,006	8,600,337
Sherman	4,546,245	853,565	1,112,730	1,964,543	8,477,083
Smith	18,398,918	1,610,050	5,853,324	2,206,791	28,069,083
Stafford	16,945,042	2,074,155	5,099,210	2,307,372	26,425,779
Stanton	1,673,787	6,149	199,791	644	1,880,371
Stevens	2,242,463	40,902	533,716	414	2,817,495
Sumner	27,784,027	7,059,839	9,056,345	9,736,705	53,636,916
Thomas	6,560,755	514,732	1,332,690	3,001,328	11,409,505
Trego	5,859,155	453,685	1,220,320	1,543,017	9,076,177
Wabaunsee	14,296,279	1,823,670	4,340,475	3,719,635	23,680,059
Wallace	2,420,383	212,889	628,704	1,624,998	4,886,974
Washington	26,053,890	2,525,280	7,584,140	3,505,134	39,668,444
Wichita	1,983,408	106,104	446,706	949,817	3,486,035
Wilson	11,491,295	3,523,670	6,028,020	10,507,644	31,550,629
Woodson	7,680,410	1,627,770	2,261,545	3,342,615	14,862,340
Wyandotte	10,052,490	65,188,734	20,892,465	16,705,335	112,839,024

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WHEAT, 1860 TO 1912.

TABLE showing acres, annual product, value and average yield of wheat (winter and spring).

YEARS.	Acres.	Bushels.	Value.	Average yield per acre.
				bus.
1860	....	168,527	....	....
1861	....	185,379	....	....
1862	9,360	202,232	$149,652.00	21.00
1863	16,434	262,953	231,399.00	16.00
1864	13,439	201,598	405,212.00	15.00
1865	12,768	191,519	338,989.00	15.00
1866	12,171	260,456	497,488.00	21.40
1867	89,285	1,250,000	2,300,000.00	14.00
1868	98,525	1,537,000	2,074,950.00	15.60
1869	151,351	2,800,000	2,212,000.00	18.50
1870	156,200	2,343,000	2,014,980.00	15.00
1871	169,433	2,694,000	3,044,220.00	15.90
1872	185,775	2,155,000	3,060,100.00	11.60
1873	309,286	4,330,000	4,330,000.00	14.00
1874	716,205	9,881,383	7,631,671.00	13.79
1875	743,206	13,209,403	11,350,375.38	17.77
1876	1,023,183	14,620,225	12,413,780.89	14.28
1877	1,063,993	14,316,705	12,240,128.72	13.45
1878	1,730,812	32,315,358	18,441,066.84	18.67
1879	1,932,798	20,550,936	18,448,711.14	10.63
1880	2,444,434	25,279,884	20,980,668.57	10.34
1881	2,182,872	20,479,689	21,705,275.80	9.38
1882	1,602,997	35,734,846	24,003,820.90	22.29
1883	1,559,362	30,024,936	22,322,119.58	19.25
1884	2,237,128	48,050,431	20,516,560.93	21.47
1885	1,290,549	10,772,181	6,829,945.00	8.34
1886	1,758,393	14,579,093	8,482,508.00	8.29
1887	1,373,915	9,278,501	5,759,449.60	6.75
1888	1,120,119	16,724,717	12,097,814.11	14.93
1889	1,594,285	35,319,851	19,917,701.21	22.15
1890	2,321,113	28,801,214	23,410,548.00	12.40
1891	3,733,910	58,550,653	42,596,759.09	15.68
1892	4,129,829	74,538,906	40,691,762.03	18.05
1893	5,110,873	24,827,523	11,032,932.04	4.85
1894	4,840,892	28,205,700	11,297,797.13	5.82
1895	4,171,971	16,001,060	7,463,118.47	3.84
1896	3,357,727	27,754,888	13,257,193.77	8.27
1897	3,444,364	51,026,604	34,385,304.69	14.81
1898	4,624,731	60,790,661	32,937,042.28	13.14
1899	4,988,952	43,687,013	22,406,410.00	8.76
1900	4,378,533	77,339,091	41,974,145.00	17.66
1901	5,316,482	90,333,095	50,610,505.00	16.99
1902	6,301,040	54,649,236	29,139,490.00	8.67
1903	5,964,866	94,041,902	52,426,355.55	15.76
1904	5,861,712	65,141,629	51,409,255.86	11.11
1905	5,925,338	77,178,177	53,889,365.76	13.02
1906	6,436,085	93,292,980	55,178,711.62	14.49
1907	7,235,283	74,155,695	56,787,511.85	10.24
1908	5,939,351	76,808,922	63,885,145.74	11.06
1909	6,450,734	80,958,740	75,941,189.83	12.55
1910	4,870,450	61,017,339	52,785,965.32	12.53
1911	4,643,398	50,809,435	43,840,589.85	10.94
1912	6,242,855	83,889,128	71,227,437.25	14.24

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CORN, 1860 TO 1912.

TABLE showing acres, annual product, value, and average yield per acre.

YEARS.	Acres.	Bushels.	Value.	Average yield per acre.
				bus.
1860	....	5,678,834	....	....
1861	....	6,246,717	....	....
1862	170,365	6,814,601	$2,180,672.00	40.00
1863	193,597	8,518,251	2,555,475.00	44 00
1864	186,923	4,673,061	6,402,121.00	25.00
1865	163,463	6,729,236	3,566,495.00	41.00
1866	190,858	6,527,358	4,112,235.00	34.20
1867	211,373	8,159,000	4,487,450.00	38.60
1868	360,388	6,487,000	6,422,130.00	18.00
1869	506,198	24,500,000	10,780,000.00	48.40
1870	505,892	16,685,000	9,677,300.00	33.00
1871	617,325	24,693,000	7,160,970.00	40.00
1872	769,636	29,631,000	6,518,820.00	38.50
1873	1,202,046	47,000,000	14,570,000 00	39.10
1874	1,525,421	15,699,078	12,064,424.00	10.25
1875	1,932,861	80,798,769	19,071,698.15	48.80
1876	1,844,454	82,308,176	19,217,332.24	43.68
1877	2,563,112	103,497,831	20,206,184.92	40.38
1878	2,405,482	89,324,971	17,018,968.79	37.13
1879	2,995,070	108,704,927	26,562,674.46	36.29
1880	3,554,396	101,421,718	24,926,079.07	28.53
1881	4,171,554	80,760,542	44,859,963.29	19.33
1882	4,441 886	157,005,722	51,838,366.27	35.36
1883	4,653,170	182,084,526	47,492,663.48	39.14
1884	4,545,908	190,870,686	39,512,784.32	41.99
1885	5,266,084	177,350,703	40,423,327.08	33.67
1886	5,802,018	139,569,182	37,966,081.80	24.05
1887	6,530,392	75,791,454	26,836,422.70	11.60
1888	6,993,207	168,754,087	52,395,948.65	24.13
1889	6,820,693	273,888,321	51,649,876.18	40.15
1890	5,755,691	51,090,229	21,491,961.00	8.84
1891	5,209,234	139,363,991	48,057,978.93	26 75
1892	5,603,588	138,658,621	42,089,849.01	27.74
1893	6,172,462	118,624,369	32,621,762.62	19.20
1894	6,404,705	66,952,833	25,354,190.27	10.45
1895	8,394,871	201,457,396	46,189,772.72	24.00
1896	7,897,575	221,419,414	35,638,013.17	28.03
1897	8,293,819	152,140,993	28,555,298.05	18.34
1898	7,237,601	126,999,132	30,298,097.93	17.54
1899	8,194,561	225,183,432	53,530,576.00	27.48
1900	7,369,020	134,528,677	39,581,885.00	18.25
1901	6,722,973	42,605,672	21,781,215.39	6.33
1902	6,990,764	201,367,102	78,321,653 26	28.80
1903	6,525,777	169,359,769	57,078,141.67	25.95
1904	6,494,158	132,021,774	50,713,955.74	20.33
1905	6,799,755	190,519,598	68,718,583.91	28.01
1906	6,584,535	187,021,214	65,115,203.01	28.40
1907	6,809,012	145,288,826	63,040,743.32	21.33
1908	7,057,535	150,640,516	82,642,461.72	21.34
1909	7,711,879	147,005,120	83,066,905.22	19.06
1910	8,589,682	152,810,884	76,402,327.52	17.79
1911	7,760,087	105,047,068	59,599,408 03	13.54
1912	6,884,044	156,499,382	83,483,681.05	22.73

OATS, 1860 TO 1912.

TABLE showing acres, annual product, value, and average yield per acre.

YEARS.	Acres.	Bushels.	Value.	Average yield per acre.
				bus.
1860	....	80,744		
1861	....	88,818	....	....
1862	2,936	96,892	$30,037.00	33.00
1863	3,876	116,270	44,183.00	30.00
1864	5,051	146,500	141,372.00	29.00
1865	4,567	155,290	102,880.00	34.00
1866	5,136	200,316	94,148.00	39.00
1867	6,555	236,000	115,640.00	36.00
1868	9,880	247,000	140,790.00	25.00
1869	35,629	1,500,000	555,000.00	42.10
1870	117,079	3,688,000	1,475,200.00	31.50
1871	127,547	4,056,000	1,216,800.00	31.80
1872	187,200	6,084,000	1,338,480.00	32.50
1873	283,636	9,360,000	2,152,800.00	33.00
1874	314,926	7,700,586	4,064,424.00	24.25
1875	289,437	9,794,051	2,396,257.78	33.88
1876	391,845	12,386,216	2,707,736.51	31.61
1877	310,226	12,768,488	2,050,001.77	41.16
1878	444,191	17,411,473	2,937,900.63	39.19
1879	573,892	13,326,637	3,397,416.53	23.22
1880	477,827	11,483,796	2,918,689 17	24.03
1881	338,130	9,900,768	3,855,749 77	29.28
1882	529,234	21,946,284	5,766,579.15	41.46
1883	694,576	30,987,864	6,135,778.95	44.61
1884	780,831	29,087,294	5,568,332.75	37.25
1885	905,372	31,561,490	6,558,303.45	34.86
1886	1,181,807	35,892,885	8,860,603.55	30.37
1887	1,577,076	46,727,418	12,232,243.62	29.62
1888	1,656,814	54,665,055	12,470,908.35	32.99
1889	1,689,801	47,922,889	7,654,812.83	28.42
1890	1,227,371	29,175,582	9,174,400.00	23.77
1891	1,298,745	39,904,443	10,594,457.48	30.72
1892	1,559,049	43,722,484	11,140,224.70	28.04
1893	1,758,127	28,194,717	6,488,342.03	16.03
1894	1,427,444	18,385,469	5,071,543.74	12.88
1895	1,606,343	31,664,748	5,620,188.06	19.71
1896	1,477,844	19,314,772	2,706,652.80	13.06
1897	983,355	23,431,273	3,828,192.27	23.82
1898	1,054,900	21,702,537	4,268,861.10	20 57
1899	944,434	26,046,773	4,951,636.00	27.57
1900	1,058,259	31,169,982	6,626,444.00	29.45
1901	1,168,338	20,806,329	7,375,817.73	17.80
1902	1,023,171	32,966,114	9,564,254.35	32.21
1903	1,225,660	28,025,729	8,042,764.06	22.86
1904	1,265,043	21,819,257	6,872,890.26	17.24
1905	1,132,805	29,962,987	8,384,709 66	26.45
1906	1,193,003	26,560,919	7,760,395.66	22.26
1907	1,109,600	14,104,194	5,511,113.21	12.71
1908	831,159	16,707,979	7,118,847.22	20.10
1909	962,004	25,588,220	10,254,259.61	26.60
1910	1,707,312	53,993,474	18,441,607.62	31.62
1911	2,149,506	32,052,145	12,450,341.25	14.91
1912	1,512,660	42,298,386	16,074,547.72	27.96

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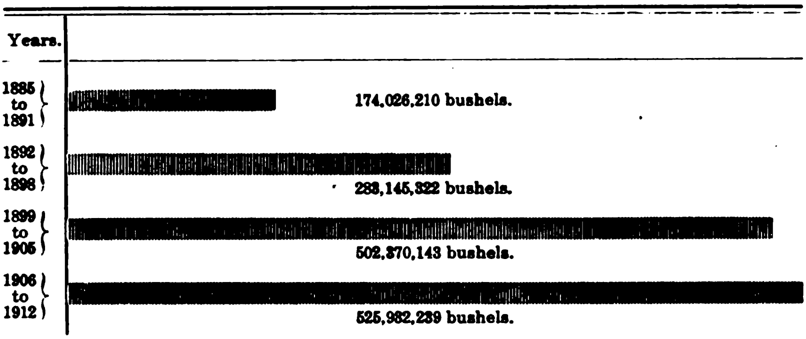
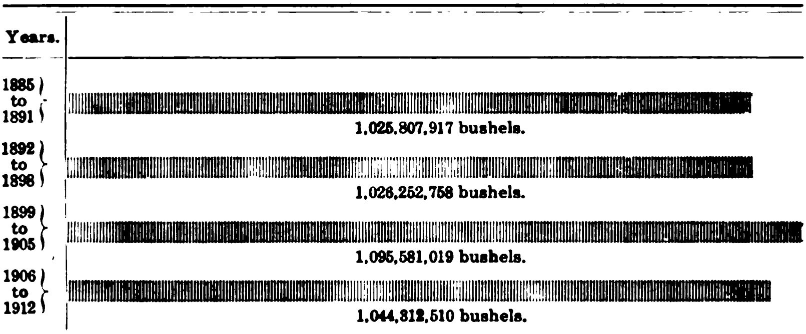
WHEAT, 1885 TO 1912.

DIAGRAM showing relative product of Kansas wheat (winter and spring) by seven-year periods.



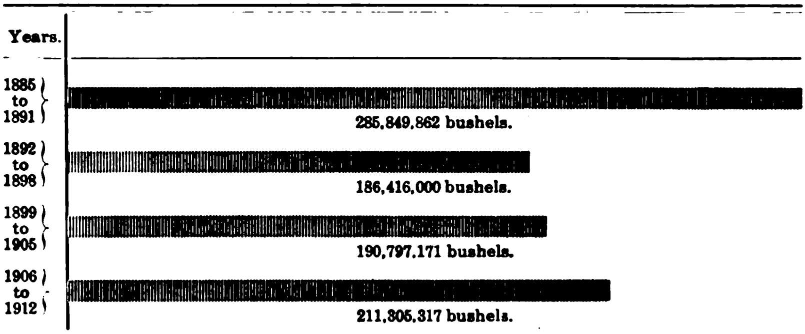
CORN, 1885 TO 1912.

DIAGRAM showing relative product of Kansas corn by seven-year periods.



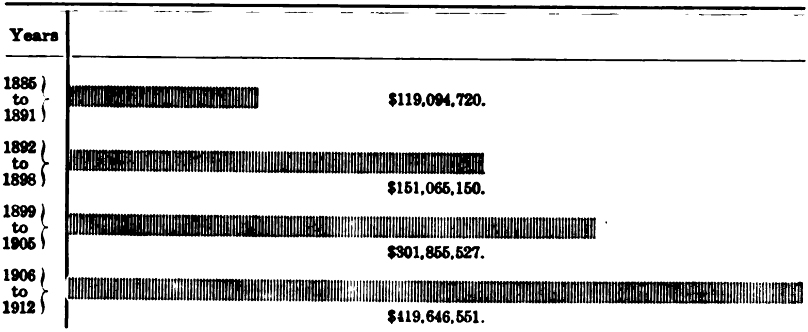
OATS, 1885 TO 1912.

DIAGRAM showing relative product of Kansas oats by seven-year periods.



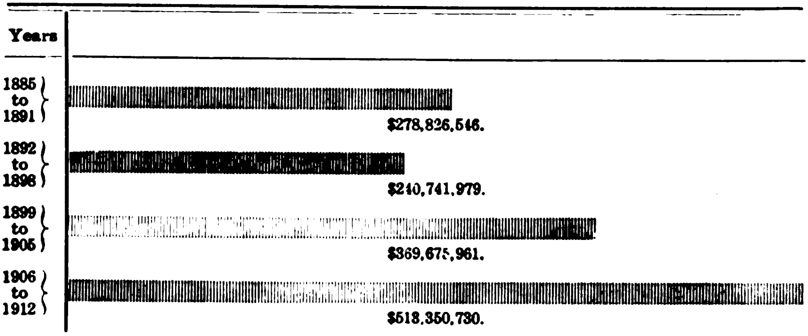
WHEAT, 1885 TO 1912.

DIAGRAM showing relative value of Kansas wheat (winter and spring) by seven-year periods.



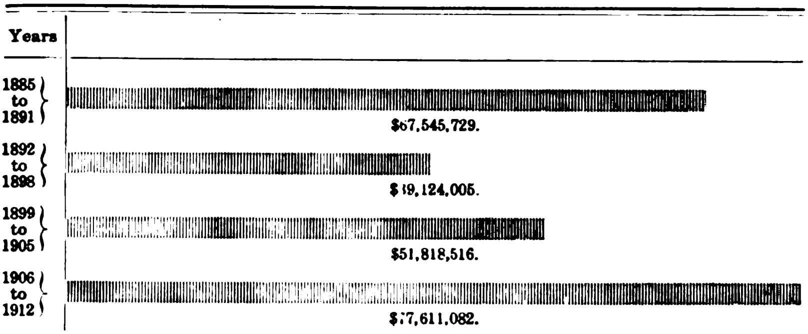
CORN, 1885 TO 1912.

DIAGRAM showing relative value of Kansas corn by seven-year periods.



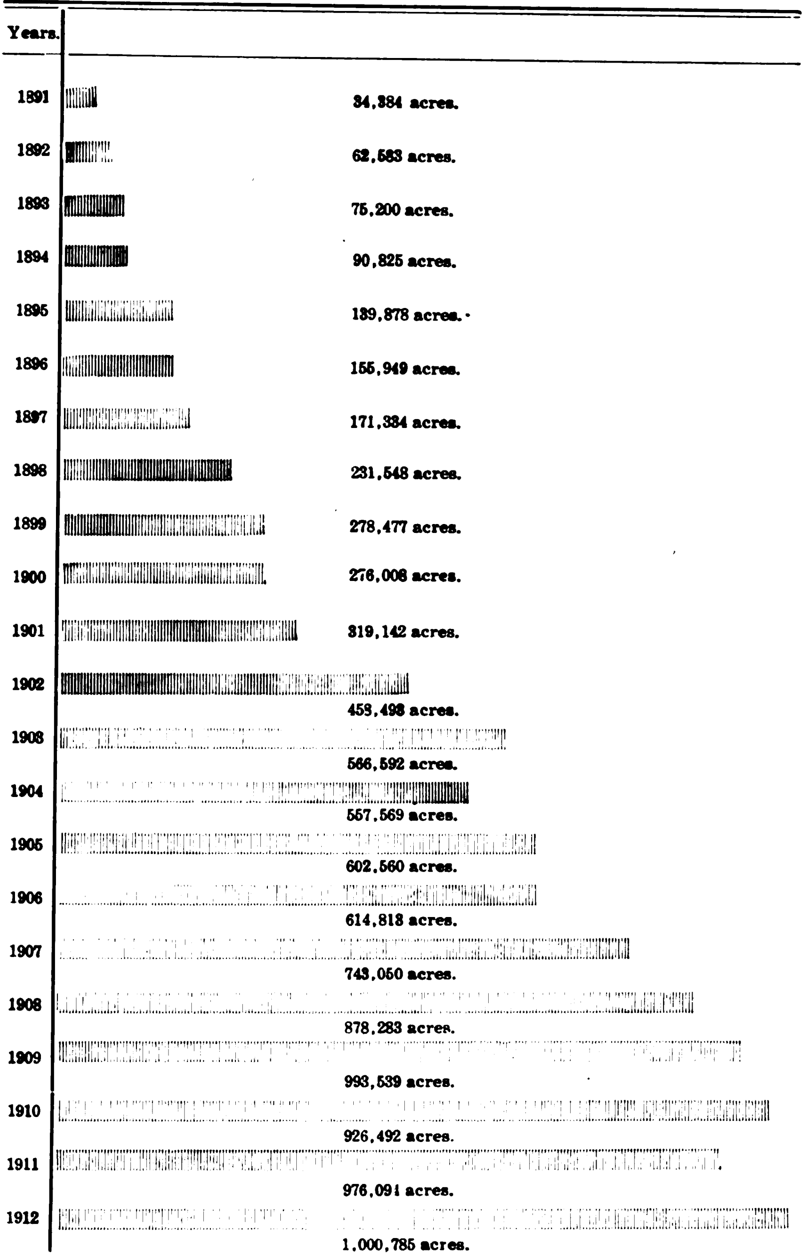
OATS, 1885 TO 1912.

DIAGRAM showing the relative value of Kansas oats by seven-year periods.

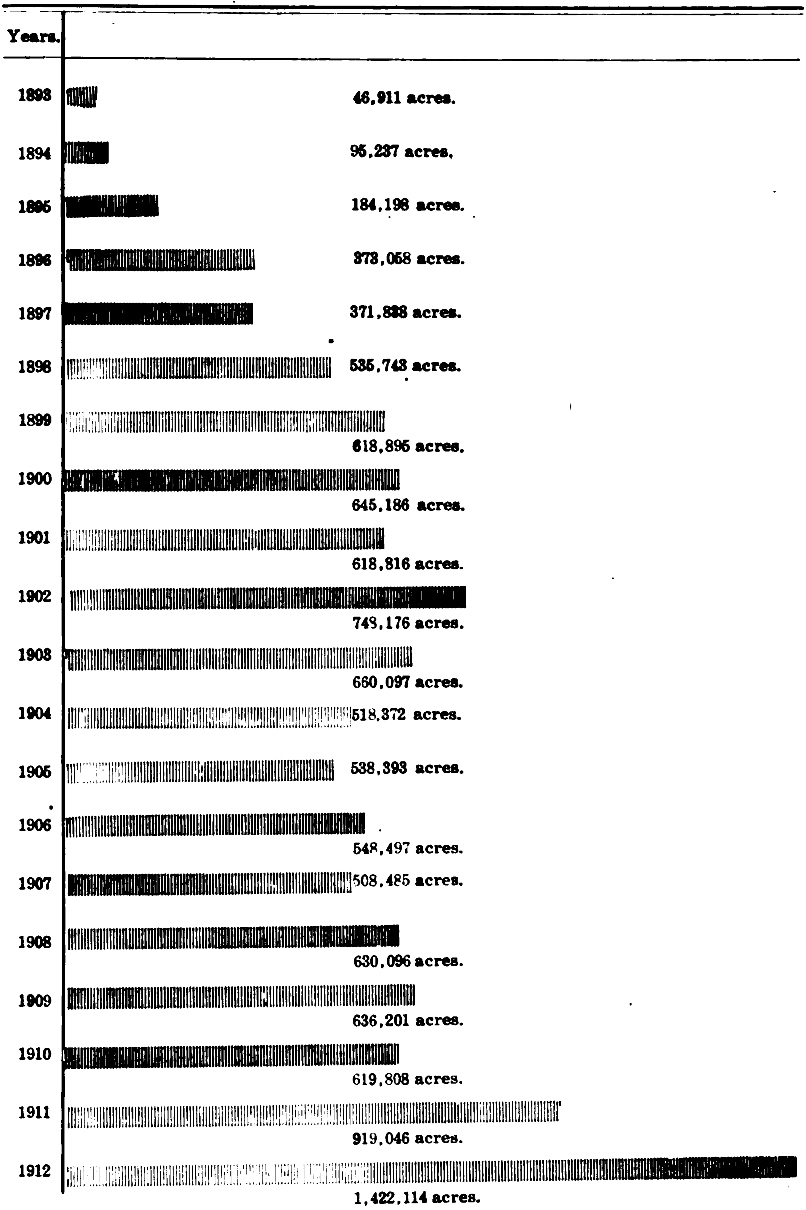


ALFALFA.

Acreage in Kansas, 1891 to 1912, inclusive.



ACREAGE of Kafir corn in Kansas, 1893 to 1912.



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VALUE of Kansas Kafir corn from 1893 to 1912.

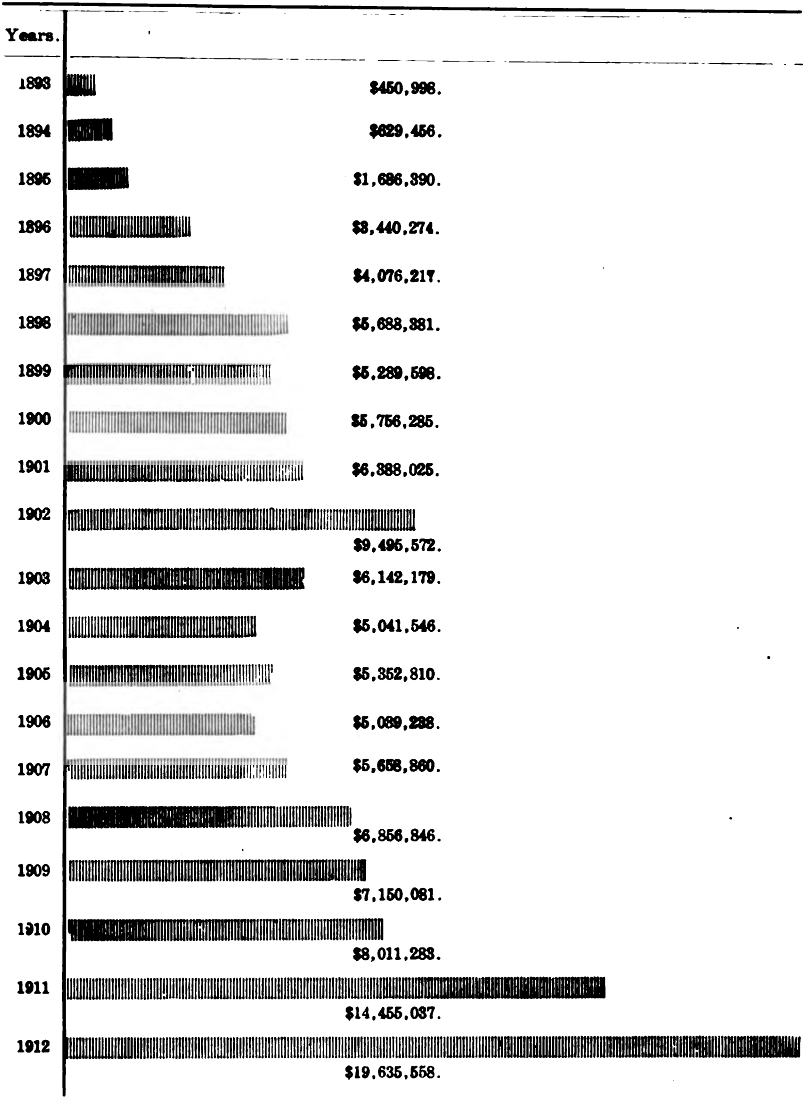


DIAGRAM showing the acreage of milo maize in Kansas, 1903 to 1912.

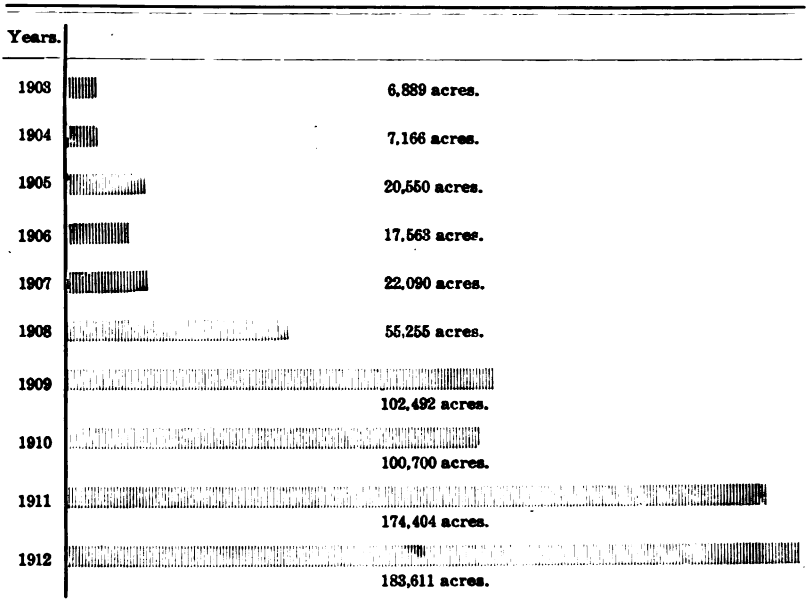


DIAGRAM showing the values of milo maize in Kansas, 1903 to 1912.

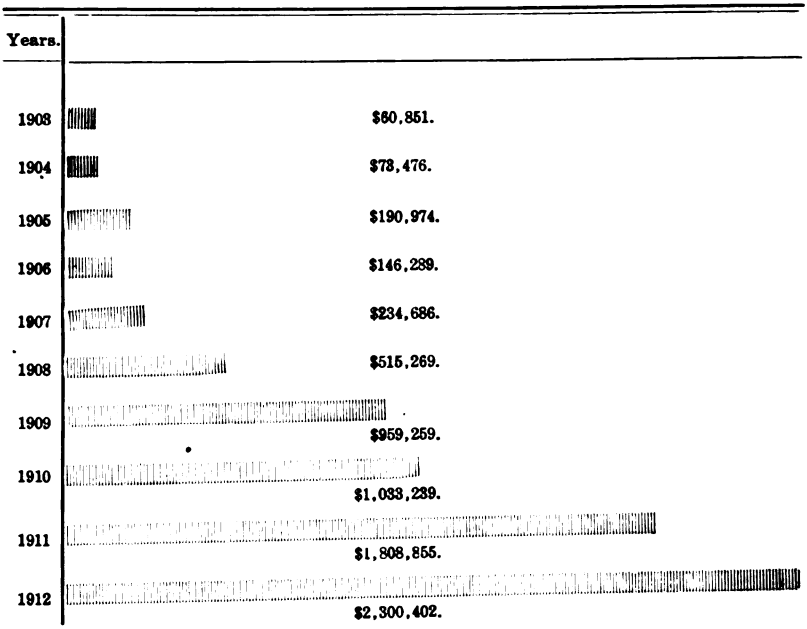


Diagram showing the relative home values of Kansas agricultural products, not including live stock, on hand (kept over) by five-year periods, 1893 to 1912, inclusive.

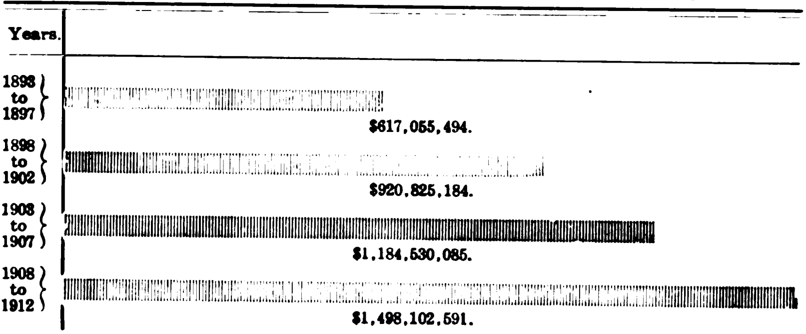


Diagram showing relative values of Kansas live stock by five-year periods.

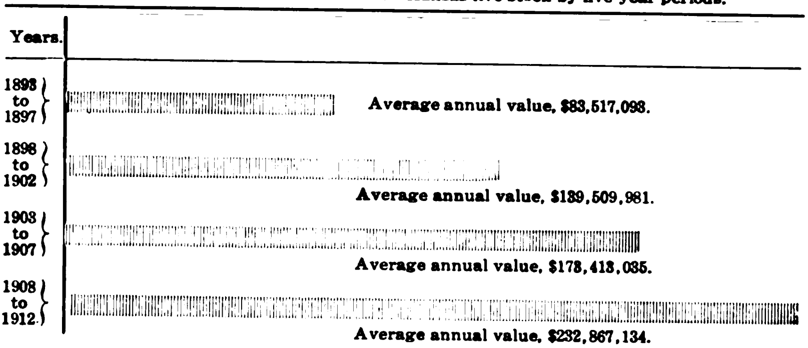


Diagram showing the relative values of Kansas butter by five-year periods.

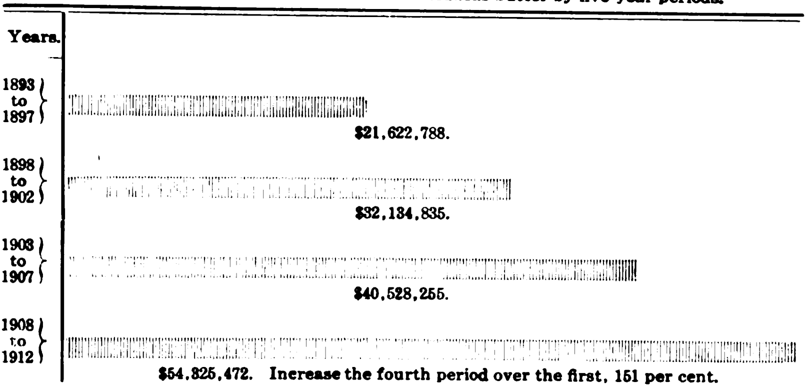


DIAGRAM showing the relative values of Kansas poultry and eggs sold by five-year periods.

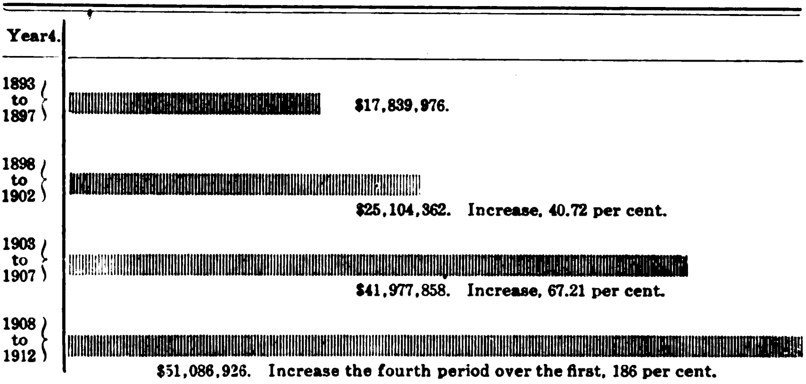


DIAGRAM showing relative annual average Kansas acreage of alfalfa by five-year periods.

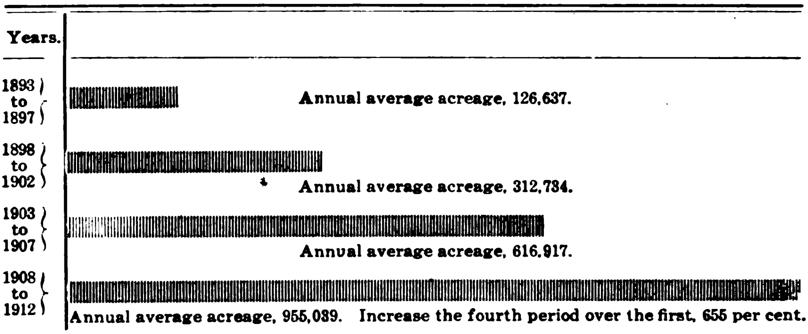


DIAGRAM showing relative values of Kansas Kafir corn by five-year periods. Comparative values.

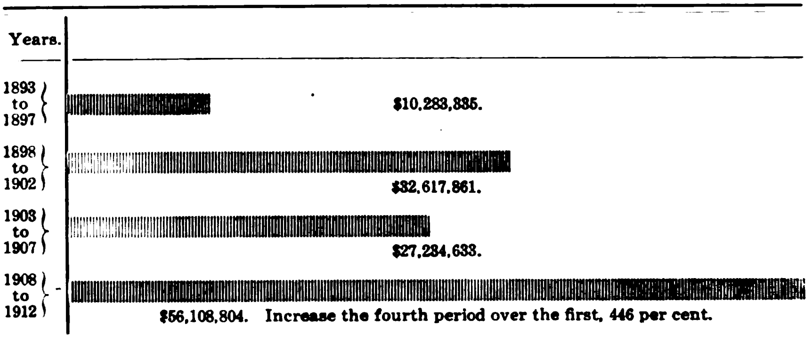
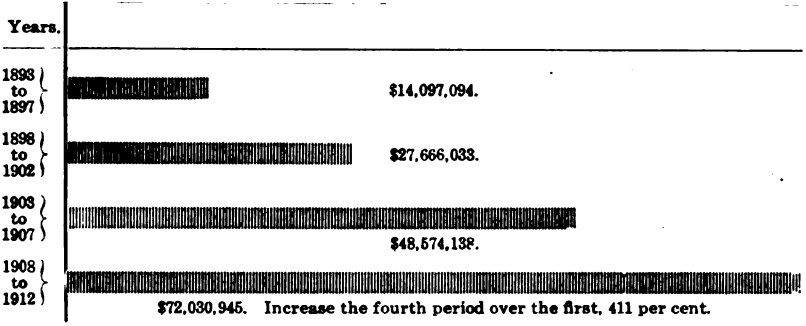
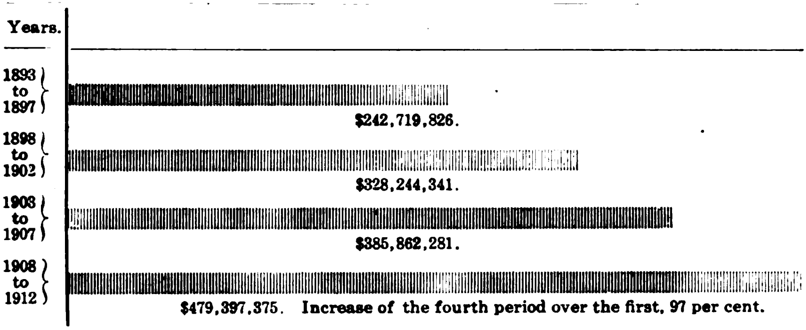


Diagram showing relative values of Kansas tame hay by five-year periods. Comparative values.



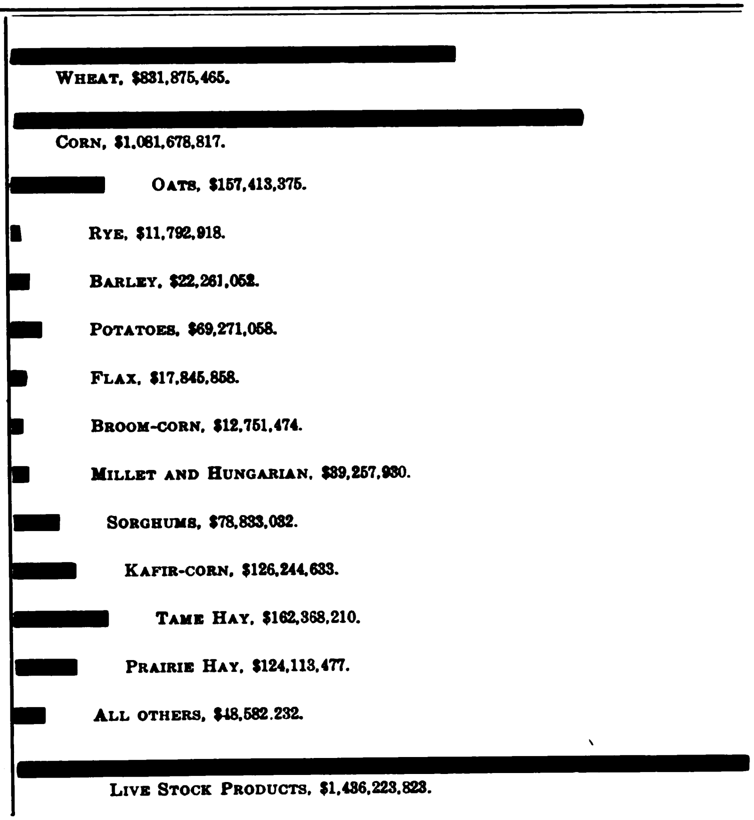
LIVE-STOCK PRODUCTS, 1893 TO 1912.

Diagram showing relative values of Kansas live stock by five-year periods.



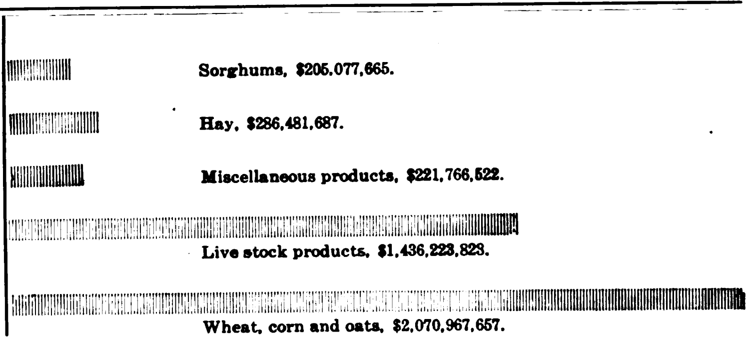
1893 TO 1912.

TWENTY YEARS OF AGRICULTURE IN KANSAS, HOME VALUES—NOT INCLUDING LIVE STOCK.



TWENTY YEARS OF AGRICULTURE, 1893 TO 1912.

DIAGRAM showing the relative combined values of Kansas wheat, corn and oats compared with combinations of the other products, not including live stock.



LIVE STOCK, 1889 TO 1912.

TABLE showing the numbers of the various kinds of live stock and their aggregate value.

YEARS.	Horses.	Mules and asses.	Milch cows.	Other cattle.	Sheep.	Swine.	Value.
1889	719,394	90,357	723,552	1,738,436	293,853	1,641,955	$116,191,465
1890	716,459	78,346	674,705	1,696,081	281,654	2,192,231	113,533,342
1891	776,533	77,170	696,611	1,770,591	260,658	2,085,875	117,674,951
1892	804,923	79,262	631,386	1,708,368	240,568	1,605,098	109,024,141
1893	860,186	88,585	567,353	1,505,273	224,952	1,406,086	98,266,668
1894	864,651	86,729	524,127	1,291,793	166,384	1,623,375	78,738,754
1895	852,789	95,169	517,254	1,258,919	136,520	1,666,221	72,939,258
1896	846,841	93,448	515,075	1,305,307	182,236	1,833,091	73,665,900
1897	801,427	86,919	552,538	1,603,943	222,703	2,399,494	94,074,885
1898	777,828	84,223	605,925	1,998,140	207,482	2,766,071	113,227,933
1899	796,866	87,838	684,182	2,201,886	232,039	2,340,992	133,057,092
1900	786,888	89,064	712,582	2,443,043	200,301	2,286,734	143,457,753
1901	825,553	89,725	793,389	2,613,885	186,987	2,114,201	152,699,716
1902	811,594	95,671	791,844	2,555,800	136,753	1,427,302	155,107,412
1903	845,404	101,089	802,738	2,745,586	167,044	1,770,585	163,552,590
1904	835,580	103,436	792,712	2,757,542	167,721	2,127,482	159,010,755
1905	879,258	114,091	763,803	2,637,222	158,591	2,133,555	169,821,157
1906	862,596	115,362	711,152	2,377,330	176,177	2,177,125	177,429,816
1907	899,063	127,593	690,318	2,171,276	159,241	2,608,574	197,250,857
1908	928,956	144,997	687,432	1,953,435	136,191	2,705,057	197,510,878
1909	958,335	173,609	671,662	2,018,965	159,271	2,157,048	225,147,081
1910	966,747	189,969	641,570	1,878,641	175,250	1,753,825	234,878,692
1911	1,063,998	222,869	809,623	1,706,266	326,684	2,237,870	251,632,487
1912	1,045,426	232,751	886,068	1,520,263	208,755	1,713,433	255,166,533

PRODUCTS OF LIVE STOCK, 1889 TO 1912.

TOTAL VALUE, to wit: Animals slaughtered and sold for slaughter, wool clip, butter and cheese manufactured, and poultry, eggs and milk sold.

YEARS.	Value.	Years.	Value.	Years.	Value.
1889	$40,762,488.62	1897	$46,983,923.86	1905	$69,828,806.62
1890	39,998,285.04	1898	59,417,008.00	1906	81,571,923.62
1891	45,724,709.24	1899	61,410,801.00	1907	97,324,198.47
1892	42,853,835.68	1900	67,014,901.00	1908	87,678,468.30
1893	51,225,617.55	1901	74,706,299.00	1909	88,624,467.06
1894	50,708,714.08	1902	65,695,331.00	1910	101,276,925.88
1895	48,591,362.97	1903	69,865,096.25	1911	106,060,402.42
1896	45,210,214.63	1904	67,272,262.84	1912	95,757,113.13

POPULATION, AREA, ETC., 1911 AND 1912.

TABLE showing, by counties, the date of organization, area and population.

COUNTIES.	Date of organization.	Population.		Area, 1912.	
		1911.	1912.	Square miles.	Acres.
The State		1,686,647	1,669,296	82,144	52,572,160
Allen	1855	26,127	24,794	504	322,560
Anderson	1855	12,714	12,938	576	368,640
Atchison	1855	30,081	* 30,081	423	270,720
Barber	1873	9,915	9,746	1,134	725,760
Barton	1872	19,436	19,008	900	576,000
Bourbon	1855	25,231	* 25,231	637	407,680
Brown	1855	21,987	20,335	576	368,640
Butler	1855	21,927	21,758	1,428	913,920
Chase	1859	7,436	6,808	750	480,000
Chautauqua	1875	10,917	10,330	651	416,640
Cherokee	1866	36,792	35,611	589	376,960
Cheyenne	1886	4,189	3,798	1,020	652,800
Clark	1885	4,358	4,356	975	624,000
Clay	1866	15,532	15,772	660	422,400
Cloud	1866	19,004	19,302	720	460,800
Coffey	1859	14,677	15,099	648	414,720
Comanche	1885	3,740	4,298	795	508,800
Cowley	1870	32,854	32,745	1,112	711,680
Crawford	1867	52,154	50,272	592	378,880
Decatur	1880	8,114	7,268	900	576,000
Dickinson	1857	25,697	25,438	851	544,640
Doniphan	1855	13,759	13,675	379	242,560
Douglas	1855	24,934	25,205	469	300,160
Edwards	1874	7,192	7,156	612	391,680
Elk	1875	10,017	9,146	651	416,640
Ellis	1867	12,023	12,239	900	576,000
Ellsworth	1867	10,276	9,929	720	460,800
Finney	1884	6,756	6,130	1,296	829,440
Ford	1873	11,141	11,618	1,080	691,200
Franklin	1857	20,590	21,017	576	368,640
Geary	1855	10,483	10,074	407	260,480
Gove	1886	5,640	4,516	1,080	691,200
Graham	1880	8,198	8,074	900	576,000
Grant	1888	1,096	981	576	368,640
Gray	1887	3,038	3,027	864	552,960
Greeley	1888	1,278	1,088	780	499,200
Greenwood	1862	15,589	15,468	1,155	739,200
Hamilton	1886	3,081	2,797	972	622,080
Harper	1873	13,427	13,737	810	518,400
Harvey	1872	19,189	19,196	540	345,600
Haskell	1887	1,015	901	576	368,640
Hodgeman	1879	3,036	2,933	864	552,960
Jackson	1857	16,223	16,088	658	421,120
Jefferson	1855	15,929	15,837	568	363,520
Jewell	1870	18,086	17,822	900	576,000
Johnson	1855	17,721	17,985	480	307,200
Kearny	1888	2,987	2,431	864	552,960
Kingman	1873	12,415	12,336	864	552,960
Kiowa	1886	6,106	6,063	720	460,800
Labette	1867	34,163	34,196	649	415,360
Lane	1886	2,473	2,154	720	460,800
Leavenworth	1855	40,212	40,119	455	291,200
Lincoln	1870	10,173	10,266	720	460,800
Linn	1855	15,678	15,874	637	407,680
Logan	1888	4,010	3,537	1,080	691,200
Lyon	1858	25,230	27,548	858	549,120
Marion	1865	22,700	22,753	954	610,560
Marshall	1855	22,959	22,461	900	576,000
McPherson	1870	20,975	21,037	900	576,000

POPULATION, AREA, ETC., 1911 AND 1912—CONCLUDED.

COUNTIES.	Date of organization.	Population.		Area, 1912.	
		1911.	1912.	Square miles.	Acres.
Meade	1885	5,171	5,196	975	624,000
Miami	1855	18,951	18,628	588	376,320
Mitchell	1870	14,033	13,690	720	460,800
Montgomery	1869	54,231	50,748	648	414,720
Morris	1858	12,025	11,484	700	448,000
Morton	1886	1,287	1,333	729	466,560
Nemaha	1855	20,224	20,107	720	460,800
Neosho	1864	22,795	22,189	576	368,640
Ness	1880	6,240	6,075	1,080	691,200
Norton	1872	10,572	10,305	900	576,000
Osage	1859	20,404	20,045	720	460,800
Osborne	1871	12,6[illegible]4	12,429	900	576,000
Ottawa	1866	11,605	11,547	720	460,800
Pawnee	1872	9,015	8,557	756	483,840
Phillips	1872	13,983	13,531	900	576,000
Pottawatomie	1856	16,635	16,420	848	542,720
Pratt	1879	10,415	10,984	720	460,800
Rawlins	1881	6,118	5,594	1,080	691,200
Reno	1872	38,370	37,482	1,260	806,400
Republic	1868	16,823	16,985	720	460,800
Rice	1871	14,263	14,527	720	460,800
Riley	1855	15,671	15,792	617	394,880
Rooks	1872	10,961	10,465	900	576,000
Rush	1874	7,672	7,774	720	460,800
Russell	1872	11,160	11,034	900	576,000
Saline	1859	20,095	20,672	720	460,800
Scott	1886	2,765	2,482	720	460,800
Sedgwick	1870	75,804	75,765	1,008	645,120
Seward	1886	4,833	4,228	648	414,720
Shawnee	1855	60,698	64,225	558	357,120
Sheridan	1880	5,309	4,744	900	576,000
Sherman	1886	4,541	3,705	1,080	691,200
Smith	1872	15,630	15,683	900	576,000
Stafford	1879	11,752	11,556	792	506,880
Stanton	1887	964	805	672	430,080
Stevens	1886	2,344	2,308	729	466,560
Sumner	1871	28,720	28,840	1,188	760,320
Thomas	1885	5,026	4,007	1,080	691,200
Trego	1879	5,099	4,614	900	576,000
Wabaunsee	1859	12,213	12,302	804	514,560
Wallace	1888	2,424	2,058	900	576,000
Washington	1860	20,162	20,014	900	576,000
Wichita	1886	1,746	1,558	720	460,800
Wilson	1865	19,393	19,088	576	368,640
Woodson	1855	10,106	10,120	504	322,560
Wyandotte	1859	104,126	104,714	153	97,920

* Population in 1911. No enumeration in 1912.

POPULATION OF CITIES OF KANSAS

Having 1000 inhabitants and upwards March 1, 1912, in the order of their rank.

RANK AND NAME.	Population.	NAME AND RANK.	Population.
1 Kansas City	86,826	66 Caldwell	2,133
2 Wichita	56,379	67 Sterling	2,131
3 Topeka	46,385	68 Weir	2,100
4 Leavenworth	22,353	69 Lyons	2,098
5 Hutchinson	16,735	70 Marion	2,052
6 Atchison	*16,429	71 Marysville	2,048
7 Coffeyville	15,675	72 Sabetha	2,045
8 Pittsburg	15,419	73 Hays	1,976
9 Parsons	13,790	74 Liberal	1,937
10 Lawrence	12,854	75 Minneapolis	1,888
11 Fort Scott	*11,830	76 Ellsworth	1,805
12 Emporia	11,334	77 Mineral	1,780
13 Salina	10,096	78 Pleasanton	1,775
14 Independence	9,630	79 Norton	1,760
15 Chanute	8,413	80 Chetopa	1,757
16 Newton	8,114	81 Oakland	1,734
17 Iola	8,037	82 Blue Rapids	1,714
18 Arsansas City	7,917	83 Washington	1,666
19 Ottawa	7,740	84 Russell	1,618
20 Winfield	7,677	85 St. John	1,607
21 Manhattan	6,453	86 Stafford	1,572
22 Wellington	6,302	87 Kinsley	1,564
23 Rosedale	5,748	88 Osborne	1,561
24 Junction City	5,645	89 Goodland	1,553
25 Galena	5,409	90 Harper	1,551
26 Great Bend	5,000	91 La Harpe	1,528
27 Concordia	4,998	92 Lincoln	1,507
28 Cherryvale	4,848	93 Altoona	1,482
29 Abilene	4,331	94 Peabody	1,480
30 Herington	3.905	95 St. Marys	1,473
31 Clay Center	3,800	96 Wamego	1,465
32 Columbus	3,644	97 Smith Center	1,459
33 Dodge City	3,610	98 Kiowa	1,455
34 McPherson	3,457	99 Burlingame	1,434
35 Pratt	3,447	100 Frankfort	1,425
36 Olatha	3,387	101 Downs	1,404
37 Horton	3,242	102 Stockton	1,402
38 Paola	3,207	103 Florence	1,355
39 Hiawatha	3,122	104 Augusta	1,355
40 Caney	3,119	105 Cherokee	1,337
41 El Dorado	3,100	106 Medicine Lodge	1,330
42 Garden City	3,057	107 Sedan	1,299
43 Fredonia	3,051	108 Baxter Springs	1,290
44 Holton	3,047	109 Phillipsburg	1,271
45 Osage City	3,010	110 Baldwin	1,265
46 Frontenac	2,880	111 Mankato	1,260
47 Larned	2,810	112 Ellis	1,240
48 Osawatomie	2,802	113 Bonner Springs	1,200
49 Oswego	2,793	114 Erie	1,200
50 Beloit	2,784	115 Hillsboro	1,189
51 Neodesha	2,756	116 Greensburg	1,128
52 Anthony	2,602	117 Clyde	1,104
53 Hoisington	2,600	118 Valley Falls	1,096
54 Council Grove	2,581	119 La Cygne	1,069
55 Girard	2,464	120 Troy	1,062
56 Eureka	2,462	121 Nickerson	1,049
57 Seneca	2,283	122 Howard	1,040
58 Yates Center	2,274	123 Hanover	1,037
59 Humboldt	2,259	124 Solomon	1,035
60 Garnett	2,238	125 Halstead	1,029
61 Burlington	2,225	126 Wilson	1,029
62 Scammon	2,211	127 Coldwater	1,026
63 Lindsborg	2,198	128 Ashland	1,020
64 Kingman	2,170	129 Ellinwood	1,016
65 Belleville	2,142	130 Oskaloosa	1,002

*** Population in 1911. No enumeration made in 1912.**

Number of inhabitants in cities of above 10,000 population. 336,105.
Per cent of inhabitants in cities of above 10,000 population, 20.

STATE SUMMARY, 1911.

SHOWING the total acreage, quantities and values of farm products; also numbers and values of live stock.

CROPS.		Acres.	Quantities.	Values.
Winter wheat	bu.	4,571,708	50,704,673	$43,757,249.82
Spring wheat	bu.	71,690	104,762	83,340.03
Corn	bu.	7,760,087	105,047,068	59,599,408.03
Oats	bu.	2,149,506	32,052,145	12,450,341.25
Rye	bu.	30,559	250,265	207,960.89
Barley	bu.	311,538	1,437,169	727,224.63
Emmer ("Speltz")	bu.	31,404	78,985	37,355.31
Buckwheat	bu.	203	1,299	1,299.00
Irish potatoes	bu.	78,137	1,966,029	1,899,067.88
Sweet potatoes	bu.	3,561	294,409	300,995.36
Castor beans	bu.	122	1,006	1,257.50
Cotton	lbs.	35	8,000	800.00
Flax	bu.	108,181	364,998	650,543.90
Tobacco	lbs.	154	134,700	13,470.00
Broom corn	lbs.	55,963	14,894,375	897,398.50
Millet and hungarian	tons	170,651	242,095	1,668,445.00
Sugar beets	tons	4,963	27,256	136,280.00
Sorghum: for syrup and sugar	gals.	13,655	896,494	435,844.62
for forage or grain	tons	728,128	....	4,991,097.00
Milo maize	tons	174,404	254,599	1,808,855.00
Kafir corn	tons	919,046	2,561,415	14,455,037.00
Jerusalem corn	tons	5,582	11,860	73,399.00
Timothy	tons	367,402	1,784,886	18,785,976.50
Clover	tons	203,073		
Blue grass	tons	183,570		
Alfalfa	tons	976,094		
Orchard grass	tons	3,889		
Other tame grasses	tons	55,380		
Prairie grass under fence	tons	14,423,730	1,146,802	9,854,642.00
Totals		33,402,415	....	$172,837,288.22
Animals slaughtered and sold for slaughter			....	$82,105,615.00
Poultry and eggs sold			....	11,369,098.00
Wool clip	lbs.		676,096	114,936.32
Cheese	lbs.		50,054	7,061.48
Butter	lbs.		41,713,094	11,189,065.62
Milk sold			....	1,274,626.00
Garden and horticultural products marketed			....	3,804,515.00
Wood marketed			....	80,518.00
Honey and beeswax	lbs.		957,014	144,464.70
Total			....	$110,089,900.12
Total value of all farm products			....	$282,927,188.34

LIVE STOCK.

Showing numbers as returned by assessors March 1, and values for the year 1911.

ANIMALS.	Numbers.	Values.
Horses	1,063,998	$120,231,774.00
Mules and asses	222,869	29,195,839.00
Milch cows	809,623	32,884,920.00
Other cattle	1,706,266	46,069,182.00
Sheep	326,684	1,372,072.80
Swine	2,237,870	22,378,700.00
Total value of live stock	....	$251,632,487.80
Grand total farm products and live stock	....	$534,559,676.14

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STATE SUMMARY, 1912.

SHOWING the total acreage, quantities and values of farm products; also numbers and values of live stock.

CROPS.		Acres.	Quantities.	Values.
Winter wheat	bu.	6,195,319	88,384,920	$70,842,812.68
Spring wheat	bu.	47,536	504,208	384,624.57
Corn	bu.	6,884,044	156,499,382	83,483,681.05
Oats	bu.	1,512,660	42,298,386	16,074,547.72
Rye	bu.	36,399	545,658	389,245.28
Barley	bu.	146,184	2,833,537	1,202,241.95
Emmer ("speltz")	bu.	10,378	146,232	71,443.72
Buckwheat	bu.	356	4,377	4,377.00
Irish potatoes	bu.	56,636	4,727,823	3,438,261.46
Sweet potatoes	bu.	3,783	447,702	364,695.52
Castor beans	bu.	86	760	818.40
Cotton	lbs.	61	9,260	926.00
Flax	bu.	48,942	306,748	460,122.00
Tobacco	lbs.	114	113,300	11,330.00
Broom corn	lbs.	68,725	28,230,584	894,736.60
Millet and hungarian	tons	162,888	308,539	1,562,474.75
Sugar beets	tons	8,903	88,842	484,285.00
Sorghum: for syrup or surgar	gals.	17,813	1,320,513	632,480.34
for forage or grain	tons	713,044	....	7,049,986.00
Milo maize	tons	183,611	440,573	2,300,402.50
Kafir corn	tons	1,422,114	4,377,828	19,635,557.50
Jerusalem corn	tons	3,494	9,965	46,082.50
Timothy	tons	252,768	1,267,961	11,916,011.00
Clover	tons	119,061		
Blue grass	tons	184,155		
Alfalfa	tons	1,000,785		
Orchard grass	tons	4,334		
Other tame grasses	tons	40,228		
Prairie grass under fence	tons	14,051,336	861,283	6,583,506.50
Totals		33,175,757	....	$227,834,650.04
Animals slaughtered or sold for slaughter			....	$72,398,207.00
Poultry and eggs sold			....	10,057,983.00
Wool clip	lbs.		534,375	106,875.00
Cheese	lbs.		53,792	8,270.88
Butter	lbs.		43,626,709	11,831,375.25
Milk sold			....	1,354,302 00
Garden and horticultural products marketed			....	1,275,423.00
Wood marketed			....	72,245.00
Honey and beeswax	lbs.		322,665	49,511.65
Total			....	$97,154,292.78
Total value of all farm products			....	$324,988,942.82

LIVE STOCK.

Showing numbers as returned by assessors March 1, and values for the year 1912.

ANIMALS.	Numbers.	Values.
Horses	**1,045,426**	**$118,133,138.00**
Mules and asses	**232,751**	**30,490,381.00**
Milch cows	**886,068**	**39,873,060.00**
Other cattle	**1,520,263**	**48,648,416.00**
Sheep	**208,755**	**887,208.75**
Swine	**1,718,433**	**17,134,330.00**
Total value live stock	....	**$255,166,533.75**
Grand total farm products and live stock	....	**$580,155,476.57**

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CROP AND LIVE-STOCK STATISTICS.

1911 AND 1912.

WINTER WHEAT.

TABLE showing the number of acres, product and value for the year 1911.

COUNTIES.	1911.			
	Acres sown.	Acres harvested.	Bushels.	Value.
The State	7,303,346	4,571,708	50,704,673	$43,757,249.82
Allen	3,766	3,653	62,101	$52,164.84
Anderson	3,822	3,746	67,428	55,965.24
Atchison	38,767	37,216	669,888	589,501.44
Barber	70,265	17,566	175,660	149,311.00
Barton	265,840	210,014	2,310,154	2,056,037.06
Bourbon	6,801	6,238	99,808	82,840.64
Brown	46,170	46,170	1,108,080	919,706.40
Butler	5,975	4,421	79,578	70,028.64
Chase	2,246	2,201	48,422	41,158.70
Chautauqua	9,217	8,480	118,720	99,724.80
Cherokee	46,448	44,590	624,260	580,621.00
Cheyenne	33,808	9,128	45,640	38,337.60
Clark	82,850	39,768	198,840	169,014.00
Clay	76,617	74,318	1,189,088	1,034,506.56
Cloud	105,642	104,586	1,568,790	1,364,847.30
Coffey	10,421	10,421	250,104	212,588.40
Comanche	64,065	48,049	624,637	537,187.82
Cowley	24,183	18,341	201,751	178,505.86
Crawford	21,004	20,584	288,176	233,422.56
Decatur	168,579	55,631	111,262	89,009.60
Dickinson	89,543	87,752	1,316,280	1,158,326.40
Doniphan	27,996	27,996	559,920	503,928.00
Douglas	30,329	29,419	529,542	455,406.12
Edwards	150,616	108,444	1,301,328	1,098,115.52
Elk	5,269	5,269	89,573	76,137.05
Ellis	211,270	78,170	156,340	129,762.20
Ellsworth	128,288	106,196	736,872	625,915.60
Finney	14,654	5,862	29,310	25,206.60
Ford	204,716	126,924	761,544	647,312.40
Franklin	10,643	10,217	194,123	168,887.01
Geary	14,713	14,419	273,961	232,866.85
Gove	102,751	....	....	....
Graham	141,739	59,530	119,060	98,819.80
Grant	1,158	116	464	417.60
Gray	46,481	16,268	81,340	68,325.60
Greeley	1,724	....	....	....
Greenwood	2,083	1,891	32,147	27,324.95
Hamilton	4,893	....	....	....
Harper	117,470	34,066	340,660	296,374.20
Harvey	69,788	69,090	1,381,800	1,243,620.00
Haskell	16,199	2,754	5,508	4,957.20
Hodgeman	55,227	14,911	44,733	40,259.70
Jackson	20,339	20,339	325,424	283,118.88
Jefferson	29,922	29,922	598,440	520,642.80
Jewell	58,607	53,918	593,098	504,133.30
Johnson	46,891	45,463	681,945	613,750.50

WINTER WHEAT, 1911—CONCLUDED.

COUNTIES.	Acres sown.	Acres harvested.	Bushels.	Value.
Kearny	4,938	889	4,445	$3,822.70
Kingman	125,617	77,883	856,713	762,474.57
Kiowa	156,405	132,944	1,861,216	1,687,870.08
Labette	16,909	16,571	231,994	199,514.84
Lane	78,150	6,252	6,252	5,376.72
Leavenworth	41,360	40,533	607,995	547,195.50
Lincoln	96,091	74,951	449,706	382,250.10
Linn	9,266	8,988	134,820	114,597.00
Logan	39,023	....	....	....
Lyon	5,214	5,214	130,350	113,404.50
Marion	69,132	67,749	1,083,984	964,745.76
Marshall	60,463	58,649	821,086	689,712.24
McPherson	132,751	123,458	1,728,412	1,486,434.32
Meade	106,631	29,857	119,428	101,513.80
Miami	31,549	30,918	494,688	430,878.56
Mitchell	112,445	85,458	683,664	581,114.40
Montgomery	25,302	24,290	388,640	338,116.80
Morris	5,480	5,480	104,120	91,625.60
Morton	685	685	2,055	1,644.00
Nemaha	22,853	22,396	425,524	361,695.40
Neosho	10,564	9,825	176,850	150,322.50
Ness	97,056	12,617	37,851	32,930.37
Norton	148,101	77,018	231,039	184,831.20
Osage	7,378	6,857	157,711	138,785.68
Osborne	128,090	65,326	261,304	224,721.44
Ottawa	97,004	96,034	1,248,442	1,073,660.12
Pawnee	259,721	181,805	1,818,050	1,545,342.50
Phillips	126,970	106,655	533,275	453,283.75
Pottawatomie	10,780	10,457	230,054	200,146.98
Pratt	194,162	137,855	1,378,550	1,185,553.00
Rawlins	135,542	16,265	48,795	41,475.75
Reno	202,075	189,951	2,469,363	2,123,652.18
Republic	58,619	58,619	879,285	747,392.25
Rice	128,525	106,676	1,173,436	997,420.60
Riley	14,795	12,872	244,568	210,828.48
Rooks	175,520	129,885	519,540	441,609.00
Rush	188,168	84,676	508,056	447,089.28
Russell	159,426	92,467	369,868	318,086.48
Saline	105,944	102,766	1,335,958	1,135,564.30
Scott	34,970	1,748	6,992	6,152.96
Sedgwick	122,123	98,920	1,384,880	1,204,845.60
Seward	42,334	12,700	50,800	43,180.00
Shawnee	9,459	9,175	211,025	179,371.25
Sheridan	125,461	....	....	....
Sherman	27,799	....	....	....
Smith	87,486	79,612	636,896	541,361.60
Stafford	210,811	183,406	2,567,684	2,182,531.40
Stanton	645	....	....	....
Stevens	9,420	2,826	19,782	16,616.88
Sumner	132,084	50,192	501,920	446,708.80
Thomas	188,048	....	....	....
Trego	105,561	12,667	38,001	31,920.84
Wabaunsee	9,661	9,081	163,458	143,843.04
Wallace	5,379	269	269	269.00
Washington	67,347	65,827	979,905	832,919.25
Wichita	26,264	788	788	693.44
Wilson	8,827	8,033	144,594	122,904.90
Woodson	2,932	2,873	60,333	53,696.37
Wyandotte	9,341	9,248	184,960	166,464.00

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WINTER WHEAT.

TABLE showing the number of acres, product and value for the year 1912.

COUNTIES.	Acres sown.	Acres harvested.	Bushels.	Value.
The State	7,815,842	6,195,819	88,384,920	$70,842,812.68
Allen	9,153	6,041	84,574	$73,579.38
Anderson	7,143	6,429	102,864	90,520.82
Atchison	52,565	44,680	938,280	797,538.00
Barber	74,542	71,560	1,073,400	869,454.00
Barton	277,355	224,658	2,471,238	2,001,702.78
Bourbon	8,046	5,069	65,897	56,671.42
Brown	58,207	41,909	1,089,634	915,292.56
Butler	10,727	9,832	167,976	142,779.60
Chase	2,527	2,350	49,350	41,454.00
Chautauqua	8,268	6,366	82,758	67,861.56
Cherokee	58,221	49,488	494,880	430,545.60
Cheyenne	43,492	39,143	548,002	405,521.48
Clark	96,972	91,154	1,276,156	969,878.56
Clay	87,117	57,497	747,461	612,918.02
Cloud	130,301	122,483	2,204,694	1,785,802.14
Coffey	12,789	12,533	238,127	200,026.68
Comanche	95,155	93,252	1,492,032	1,208,545.92
Cowley	24,883	21,648	368,016	305,453.28
Crawford	32,817	24,613	270,743	219,301.83
Decatur	135,099	70,251	281,004	210,753.00
Dickinson	106,357	94,658	1,514,528	1,257,058.24
Doniphan	39,697	33,845	733,590	616,215.60
Douglas	38,398	37,246	931,150	838,035.00
Edwards	178,307	123,048	1,599,624	1,263,702.96
Elk	5,349	4,440	66,600	58,608.00
Ellis	218,389	157,908	1,894,896	1,478,018.88
Ellsworth	134,200	119,438	2,030,446	1,563,443.42
Finney	10,310	7,320	78,200	57,096.00
Ford	237,907	223,633	3,130,862	2,348,146.50
Franklin	18,890	18,134	326,412	283,978.44
Geary	19,545	16,222	210,886	187,688.54
Gove	90,658	18,132	72,528	53,670.72
Graham	129,835	89,586	627,102	457,784 46
Grant	1,186	854	8,540	6,832.00
Gray	50,385	46,354	509,894	367,123.68
Greeley	690	179	716	572.80
Greenwood	2,751	2,751	49,518	41,595.12
Hamilton	1,684	1,095	7,665	5,748.75
Harper	125,113	116,355	1,628,970	1,319,465.70
Harvey	86,546	82,219	1,479,942	1,243,151.28
Haskell	5,673	5,503	55,030	42,373.10
Hodgeman	49,150	44,235	530,820	398,115.00
Jackson	39,065	32,033	608,627	486,901.60
Jefferson	47,461	40,816	816,820	693,872.00
Jewell	73,424	70,487	1,198,279	982,588.78
Johnson	59,014	56,063	1,177,323	1,106,683.62

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WINTER WHEAT, 1912 — CONCLUDED.

COUNTIES.	Acres sown.	Acres harvested.	Bushels.	Value.
Kearny	4,806	4,037	48,444	$37,301.88
Kingman	132,293	123,032	1,968,512	1,614,179.84
Kiowa	162,776	139,987	2,959,818	2,338,256.22
Labette	33,247	30,920	371,040	307,963.20
Lane	54,340	43,472	217,360	163,020.00
Leavenworth	49,185	46,234	970,914	873,822.60
Lincoln	113,543	111,272	2,114,168	1,627,909.36
Linn	18,511	17,771	337,649	307,250.69
Logan	34,371	6,874	20,622	16,291.38
Lyon	11,582	9,961	209,181	175,712.04
Marion	84,641	68,559	1,096,944	899,494.08
Marshall	77,877	23,363	350,445	283,860.45
McPherson	141,184	76,239	914,868	781,894.40
Meade	107,102	103,889	1,246,668	972,401.04
Miami	51,706	49,121	884,178	813,443.76
Mitchell	129,738	127,143	2,161,431	1,685,916.18
Montgomery	29,447	17,079	222,027	182,062.14
Morris	8,035	7,232	115,712	92,569.60
Morton	711	604	6,040	4,530.00
Nemaha	39,339	11,802	200,634	164,519.88
Neosho	15,644	13,297	226,049	194,402.14
Ness	74,855	53,896	431,168	319,064.32
Norton	94,904	68,331	478,317	363,520.92
Osage	16,911	15,896	286,128	240,347.52
Osborne	134,096	130,073	2,081,168	1,581,687.68
Ottawa	105,870	93,166	1,387,490	1,123,866.90
Pawnee	243,333	182,500	1,642,500	1,281,150.00
Phillips	122,744	111,697	1,228,667	921,500.25
Pottawatomie	20,463	15,961	351,142	294,959.28
Pratt	206,862.	186,176	2,792,640	2,150,332.80
Rawlins	130,145	96,307	674,149	512,353.24
Reno	239,182	222,439	3,781,463	3,100,799.66
Republic	76,823	70,677	1,272,186	1,055,914.38
Rice	147,150	104,476	1,462,664	1,170,131.20
Riley	20,055	14,239	256,302	212,730.66
Rooks	181,619	172,538	2,760,608	2,098,062.08
Rush	196,052	160,763	1,607,630	1,221,798.80
Russell	177,694	159,925	2,398,875	1,871,122.50
Saline	122,527	112,725	1,690,875	1,352,700.00
Scott	17,690	3,538	14,152	10,614.00
Sedgwick	138,359	124,505	1,992,080	1,693,268.00
Seward	38,226	33,257	399,084	299,313.00
Shawnee	16,357	15,048	361,152	308,367.68
Sheridan	118,339	42,602	170,408	120,989.68
Sherman	16,003	12,642	126,420	96,079.20
Smith	85,102	81,698	1,307,168	1,006,519.36
Stafford	233,622	135,501	1,761,513	1,338,749.88
Stanton	492	453	3,624	2,754.24
Stevens	7,593	6,606	66,060	49,545.00
Sumner	143,096	95,874	1,342,236	1,127,478.24
Thomas	151,566	65,173	325,865	231,364 15
Trego	115,349	31,144	249,152	194,338.56
Wabaunsee	17,212	15,835	300,865	252,726.60
Wallace	2,185	656	2,624	2,099.20
Washington	75,996	51,677	775,155	620,124.00
Wichita	8,358	2,090	8,360	6,270.00
Wilson	16,628	15,131	302,620	272,358.00
Woodson	5,928	5,276	89,692	76,238.20
Wyandotte	10,535	10,430	229,460	215,692.40

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SPRING WHEAT.

Table showing the number of acres, product and value for the years 1911 and 1912.

Counties.	1911.			1912.		
	Acres.	Bushels.	Value.	Acres.	Bushels.	Value.
The State	71,690	104,762	$83,340.03	47,536	504,208	$384,624.57
Allen						
Anderson						
Atchison	276	2,568	$2,144.40	9	180	$144.00
Barber						
Barton						
Bourbon	32	400	314.00			
Brown	73	1,095	876.00			
Butler	80	1,200	984.00			
Chase						
Chautauqua						
Cherokee						
Cheyenne	25,910	20,875	16,700.00	22,432	268,319	208,717.92
Clark	140	560	436.80			
Clay	60	720	561.60			
Cloud	14	168	142.80			
Coffey	21	378	283.50			
Comanche						
Cowley						
Crawford						
Decatur	481			483	1,952	1,461.00
Dickinson	210	2,982	2,451.12	46	690	572.70
Doniphan	75	1,030	854.70	38	760	638.40
Douglas	165	1,650	1,309.50			
Edwards				5	60	47.40
Elk						
Ellis	58					
Ellsworth	88	352	281.60	11	165	127.05
Finney	69	194	150.04	62	682	477.40
Ford	54	166	123.80			
Franklin	14	188	150.80			
Geary	529	5,809	4,699.29	86	921	797.19
Gove	2,846			687	4,734	3,317.80
Graham						
Grant						
Gray	214	856	651.60	21	210	144.90
Greeley	141			112	458	333.76
Greenwood	8	112	84.00			
Hamilton	69			5	35	24.85
Harper	30	240	182.40			
Harvey	31	527	411.06	10	160	126.40
Haskell	90			35	280	201.60
Hodgeman	65					
Jackson	48	681	550.62			
Jefferson	50	760	617.20			
Jewell				15	225	184.50
Johnson	92	1,136	952.00	11	210	180.30
Kearny	790	2,325	1,819.80	80	880	616.00
Kingman						
Kiowa	110	1,320	1,122.00			
Labette				70	818	650.14
Lane	178			25	125	93.75
Leavenworth						
Lincoln						
Linn	12	124	95.68			
Logan	1,547			640	1,920	1,396.11
Lyon				4	80	67.20
Marion	1,412	14,190	11,093.40			
Marshall	725	7,250	5,800.00	642	7,704	5,778.00
McPherson	219	2,230	1,686.90	499	5,002	3,758.10
Meade	694	1,388	1,013.24	160	1,600	1,120.00
Miami	624	8,688	7,022.88	7	105	96.60
Mitchell						
Montgomery						
Morris				25	350	262.50
Morton	3					
Nemaha	222	3,166	2,479.50	65	810	618.00
Neosho						
Ness	543					
Norton	137			10	60	45.60
Osage	162	2,850	2,320.50			
Osborne	146					
Ottawa	54	540	424.90			
Pawnee						

SPRING WHEAT—CONCLUDED.

COUNTIES.	1911.			1912.		
	Acres.	Bushels.	Value.	Acres.	Bushels.	Value.
Phillips				5	50	$37.50
Pottawatomie	118	2,124	$1,720 44			
Pratt						
Rawlins	4,044	3,017	2,353.26	2,380	16,410	11,960.40
Reno						
Republic	33	396	316.80	31	554	425.80
Rice				12	144	108.00
Riley	13	195	156.00	103	1,741	1,433.83
Rooks	25			16	224	161.28
Rush	165			9	81	61.56
Russell	50					
Saline	213	2,130	1,649.00	80	1,120	896.00
Scott	567			102	510	357.00
Sedgwick						
Seward	72	360	270.00	98	1,000	726.60
Shawnee	67	1,005	743.70	52	1,040	821.60
Sheridan	1,323			656	3,896	2,689.84
Sherman	16,388			14,068	160,572	120,354.00
Smith	14					
Stafford						
Stan on	25			4	28	21.28
Stevens	115	690	517.50	162	1,580	1,124.00
Sumner	130	1,040	852.80	53	636	502.44
Thomas	5,622			935	4,675	3,310.75
Trego	225					
Wabaunsee	35	525	409.50			
Wallace	1,515			1,191	4,764	3,602.24
Washington	334	3,932	3,055.40	69	828	629.28
Wichita	944			1,215	4,860	3,402.00
Wilson	17	255	204.00			
Woodson						
Wyandotte	25	875	300.00			

CORN.

TABLE showing the number of acres, product and value for the years 1911 and 1912.

COUNTIES.	1911.			1912.		
	Acres.	Bushels.	Value.	Acres.	Bushels.	Value.
The State	7,760,087	105,047,068	$59,599,408.03	6.884,044	156,499,382	$83,483,681.05
Allen	70,984	1,348,696	$728,295.84	70,751	1,273,518	$725,905.26
Anderson	71,400	1,142,400	708,288.00	76,288	1,449,472	797,209.60
Atchison	86,696	1,994,008	1,096,704.40	60,479	2,177,244	1,219,256.64
Barber	111,342	1,558,788	872,921.28	58,312	1,049,616	514,311.84
Barton	79,763	957,156	545,578.92	71,077	1,421,540	767,631.60
Bourbon	72,022	1,512,462	862,103.34	78,410	1,646,610	905,635.50
Brown	121,486	3,401,608	1,802,852.24	112,594	3,940,790	2,206,842.40
Butler	115,831	2,084,958	1,230,125.22	84,417	1,941,591	1,067,875,05
Chase	43,440	912,240	529,099.20	41,651	1,249,530	724,727.40
Chautauqua	37,558	262,906	163,001.72	26,046	182,322	111,216.42
Cherokee	65,199	1,108,383	598,526.82	71,680	573,440	344,064.00
Cheyenne	54,915			39,138	821,898	394,511.04
Clark	51,838	829,408	456,174.40	13,239	238,302	128,683.08
Clay	86,421	1,209,894	653,342.76	97,689	1,953,780	996,427.80
Cloud	89,532	1,611,576	902,482.56	80,656	2,258,368	1,129,184.00
Coffey	90,915	1,727,385	967,335.60	98,638	1,972.760	1,144,200.80
Comanche	29,518	236,144	141,686.40	14,588	277,172	144,129.44
Cowley	112,968	1,694,520	982,821.60	94,723	1,705,014	903,657.42
Crawford	81,155	1,623,100	876,474.00	81,905	1,064,765	638,859.00
Decatur	96,663			71,961	1,079,415	539,707.50
Dickinson	125,553	2,008,848	1,084,777.92	105,535	2,110,700	1,139,778.00
Doniphan	62,730	2,132,820	1,109,066.40	63,614	2,226,490	1,224,569.50
Douglas	63,446	1,268,920	774,041.20	61,637	1,910,747	1,165,555.67
Edwards	42,204	633,060	353,713.60	70.457	1,479,597	739,798.50
Elk	47,718	572,616	337,843.44	37,302	447,624	268,574.40
Ellis	42,617	85,234	57,959.12	39,954	759,126	325,110.56
Ellsworth	54,244	379,708	246,810.20	48,666	1,021,986	582,532.02
Finney	10,039	100,390	58,226.20	4,307	77,526	42,639.30
Ford	66,228	728,508	400,679.40	32,880	723,360	361,680.00

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CORN—CONCLUDED.

COUNTIES.	1911.			1912.		
	Acres.	Bushels.	Value.	Acres.	Bushels.	Value.
Franklin	75,961	1,063,454	$648,706.94	77,143	1,928,575	$1,118,573.50
Geary	41,821	836,420	444,302.60	39,554	909,742	491,260.68
Gove	48,382	....	....	32,763	458,682	252.275.10
Graham	134,739	134,739	94,317.30	102,729	1,335.477	734,512.35
Grant	1,511	....	....	919	15,623	9,373.80
Gray	19,564	215,204	118,362.20	13,113	275,373	137,686.50
Greeley	2,132	....	....	1,481	28,139	16,883.40
Greenwood	99,705	1,595,280	957,168.00	85,437	1,281,555	768,933.00
Hamilton	1,648	4,944	3,213.60	924	18,480	11,088.00
Harper	156,349	1,876,188	1,013,141.52	81,416	1,058,408	539,788.08
Harvey	77,060	1,387,080	790,635.60	69,743	1,743,575	871,787.50
Haskell	1,360	....	....	5,335	112,035	59,378.55
Hodgeman	25,077	150,462	94,791.06	15,425	308,500	154,250.00
Jackson	102,414	1,638,624	934,015.68	116,534	3,962,156	2,179,185 80
Jefferson	87,094	1,741,880	975,452.80	85,509	2,821,797	1,664,860.23
Jewell	193,838	2,519,894	1,511,936.40	171,912	5,157,360	2,578,680.00
Johnson	65,630	1,181,340	708,804.00	57,681	2,018,835	1,211,301.00
Kearny	2,822	14,110	8,466.00	1,379	31,717	16,810.01
Kingman	124,831	1,622,803	924,997.71	77,230	1,699,060	849,530.00
Kiowa	53,584	857,344	471,539.20	44,496	800,928	432,501.12
Labette	81,640	1,387,880	791,091.60	81,002	1,053,026	579,164.30
Lane	19,409	....	....	8,488	127,320	68,752.80
Leavenworth	49,486	989,720	574,037.60	46,048	1,703,776	1,039,303.36
Lincoln	66,723	600,507	384,324.48	55,911	1,397,775	782,754.00
Linn	73,762	1,106,430	641,729.40	66,694	1,533,962	812,999.86
Logan	28,182	....	....	17,253	276,048	165,628.80
Lyon	117,733	2,590,126	1,424,569.30	100,515	2,412,360	1,423,292.40
Marion	133,971	2,277,507	1,275,403.92	121,907	2,438,140	1,292,214.20
Marshall	179,995	2,519,930	1,385,961.50	209,099	3,763,782	2,032,442.28
McPherson	122,417	1,713,838	1,028,302.80	142,287	2,845,740	1,479,784.80
Meade	18,040	234,520	133,676.40	5,936	136,528	79,186.24
Miami	72.423	1,086,345	695,260.80	75,748	1,817,852	963,461.56
Mitchell	115,729	810,103	469,859.74	98,421	3,051,051	1,617,057.03
Montgomery	51,701	775,515	465,309.00	50,198	803,168	449,774.08
Morris	84,872	1,273,080	700,194.00	71,277	1,781,925	944,420.25
Morton	1,995	29,925	17.955.00	1,192	21,456	11,157.12
Nemaha	157,298	2,359,470	1,250,519.10	177,029	3,717,609	2,044,684.95
Neosho	79,920	1,518,480	804,794.40	77,587	1,086,218	597,419.90
Ness	59,210	118,420	75,788.80	21,856	415,264	211,784.64
Norton	91,915	183,830	119,489.50	105,747	1,692,952	846,476.00
Osage	97,630	1,464,450	849,381.00	86,772	1,995,756	1,057,750.68
Osborne	108,950	326,850	202,647.00	69,746	2,022,634	970,864.32
Ottawa	67,416	1,146,072	618,878.88	59,132	1,537,432	845,587.60
Pawnee	62,290	685,190	397,410.20	56,704	1,304,192	652,096.00
Phillips	111,976	1,007,784	624,826.08	121,866	2,924,784	1,433,144.16
Pottawatomie	110,225	2,314,725	1,296,246.00	97,415	2,825,035	1,610,268.95
Pratt	83.598	1,253,970	702,223.20	51,537	1,082,277	541,138.50
Rawlins	54,729	109,458	66.769.38	43,735	743,495	356,877.60
Reno	174,464	2,442,496	1,441,072.64	147,307	3,388,061	1,694,030.50
Republic	136,010	1,768,130	990,152 80	135,032	3,645,864	1,859,390.64
Rice	122,555	1,715,770	943,673.50	120,314	3,007,850	1,503,925.00
Riley	74.717	1,494,340	867,717.20	74,364	1,933,464	1,082,739.84
Rooks	78,172	156,344	96,933.28	61,463	1,536,575	737,556.00
Rush	48,118	192,472	117,427.92	38,708	696,744	397,144.08
Russell	57,694	115,388	76,156.08	39,639	792,780	436,029.00
Saline	77,531	1,395,558	767,556.90	65,099	1,432,178	830,663.24
Scott	13,698	13,698	8,492.76	5,658	79,212	47,527.20
Sedgwick	158,898	2,224,572	1,312,497.48	131,595	8,421,470	1,847,593.80
Seward	7,706	84,766	46,621.30	6,511	130,220	71,621.00
Shawnee	73,997	1,923,922	1,015,874,76	69,930	1,818,180	1,036,362.60
Sheridan	69,200	....	....	50,775	558,525	290,433.00
Sherman	34,597	....	....	19,927	398,540	191,299.20
Smith	165,238	1,982,856	1,189,713.60	170,109	6,294,033	2,895,255.18
Stafford	78,653	1,337,101	748,776.56	134,167	3,354,175	1,677,087.50
Stanton	543	....	....	569	11,380	6,828.60
Stevens	6,281	62,810	33,289.30	3,149	50,384	26,199.68
Sumner	195,668	2,739,352	1,506,643.60	172,832	4,666,464	2,333,232.00
Thomas	44,060	....	....	27,419	356,447	185,352.44
Trego	72,189	72,189	51,254.19	60,878	791,414	435,277.70
Wabaunsee	85,912	1,460,504	890,907.44	74,529	1,863,225	987,509.25
Wallace	13,035	52,140	36,498.00	7,341	110,115	61,664.40
Washington	150,075	2,101,050	1,176,588.00	148,146	2,814,774	1,548,125.70
Wichita	5,818	....	....	4,039	44,429	26,657.40
Wilson	63,325	1,076,525	592,088.75	60,324	844,536	464,494.80
Woodson	40,630	650,080	364,044.80	36,617	659,106	369,099.36
Wyandotte	7,521	135,378	87,995.70	7,184	287,360	178,163.20

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OATS.

TABLE showing the number of acres, product and value for the years 1911 and 1912.

COUNTIES.	1911.			1912.		
	Acres.	Bushels.	Value.	Acres.	Bushels.	Value.
The State..........	2,149,506	32,052,145	$12,450,341.25	1,512,660	42,298,386	$16,074,547.72
Allen..............	19,152	229,824	$91,929.60	7,209	187,434	$74,973.60
Anderson..........	19,920	219,120	92,030.40	5,478	186,252	74,500.80
Atchison..........	28,753	575,060	218,522,80	16,767	570,078	210,928.86
Barber............	22,889	457,780	164,800.80	11,243	269,832	107,932.80
Barton.	21,306	447,426	183,444.66	19,907	617,117	253,017.97
Bourbon..........	19,690	295,350	118,140.00	9,973	299,190	113,692.20
Brown............	33,956	747,032	283,872.16	35,242	1,303,954	443,344.36
Butler............	37,292	895,008	340,103.04	25,008	650,208	253,581.12
Chase.............	2,361	40,137	16,054.80	1,464	51,240	19,471.20
Chautauqua........	8,574	180,054	72,021.60	3,525	112,800	47,376.00
Cherokee..........	34,015	204,090	81,636.00	17,691	300,747	114,283.86
Cheyenne..........	2,929	....	....	3,242	77,808	29,567.04
Clark.............	10,430	208,600	93,870.00	5,732	200,620	86,266.60
Clay..............	39,446	670,582	254,821.16	37,318	1,119,540	414,229.80
Cloud.............	30,737	553,266	232,371.72	21,629	735,386	272,092.82
Coffey............	22,399	447,980	179,192.00	8,078	266,574	101,298.12
Comanche..........	3,793	68,274	28,675.08	3,656	91,400	39,302.00
Cowley............	49,148	1,032,108	371,558.88	26,602	691,652	255,911.24
Crawford..........	37,635	225,810	88,065.90	21,766	522,384	193,282.08
Decatur...........	19,153	....	....	9,660	144,900	59,409.00
Dickinson.........	39,144	665,448	266,179.20	33,860	948,080	360,270.40
Doniphan..........	16,613	431,938	172,775.20	17,529	578,457	202,459.95
Douglas...........	13,272	185,808	74,323.20	6,387	255,480	97,082.40
Edwards...........	10,916	174,656	69,862.40	13,262	384,598	153,839.20
Elk...............	11,548	150,124	58,548.36	3,642	112,902	40,644.72
Ellis.............	5,247	....	....	11,468	275,232	107,340.48
Ellsworth.........	9,538	47,690	21,937.40	11,271	293,046	123,079.32
Finney............	6,176	67,936	30,571.20	6,006	126,126	47,927.88
Ford..............	27,952	391,328	160 444.48	14,613	453,003	185,731.23
Franklin..........	20,187	282,618	115,873.38	9,434	339,624	129,057.12
Geary.............	7,785	147,915	60,645.15	6,587	184,436	73,774.40
Gove..............	6,716	....	....	10,925	152,950	62,709.50
Graham............	7,641	....	....	14,889	178,668	73,253.88
Grant.............	122	....	....	53	1,060	424.00
Gray..............	7,050	70,500	28,905.00	2,582	74,878	28,453.64
Greeley...........	167	....	....	218	2,616	1,098.72
Greenwood.........	13,071	274,491	107,051.49	2,651	74,228	28,948.92
Hamilton..........	421	....	....	420	9,240	3,880.80
Harper............	76,135	1,674,970	602,989.20	36,673	880,152	334,457.76
Harvey............	34,924	733,614	271,437.18	28,214	874,634	323,614.58
Haskell...........	1,585	4,755	2,139.75	839	18,458	7,567.78
Hodgeman..........	12,335	49,340	21,216.20	6,298	207,834	78,976.92
Jackson...........	25,120	376,800	143,184.00	15,343	460,290	161,101.50
Jefferson.........	23,073	392,241	149,051.58	14,753	486,849	170,397.15
Jewell............	27,012	351,156	150,997.08	10,892	370,328	140,724.64
Johnson...........	24,100	289,200	127,248.00	13,998	475,932	171,335.52
Kearny............	1,703	15,327	6,897.15	1,529	45,870	19,724.10
Kingman...........	52,649	1,158,278	463,311.20	24,516	661,932	251,584.16
Kiowa.............	6,179	86,506	38,927.70	4,325	108,125	46,493.75
Labette...........	59,558	893,370	357,348.00	39,218	902,014	351,785.46
Lane..............	8,379	....	....	4,443	66,645	27,990.90
Leavenworth.......	13,862	235,654	98,974.68	8,195	303,215	127,351.30
Lincoln...........	8,645	17,290	7,780.50	4,795	172,620	75,952.80
Linn..............	16,459	296,262	118,504.80	6,639	199,170	77,676.30
Logan.............	3,205	....	....	3,916	50,908	20,872.28
Lyon..............	16,715	317,585	120,682.30	6,063	169,764	67,905.60
Marion............	57,584	1,094,096	404,815.52	46,580	1,304,240	469,526.40
Marshall..........	47,957	335,699	134,279.60	48,116	1,395,364	488,377.40
McPherson.........	47,879	622,427	242,746.53	68,161	1,908,508	706,147.96
Meade.............	9,154	119,002	51,170.86	3,095	86,660	33,797.40
Miami.............	25,495	254,950	101,980.00	14,399	561,561	207,777.57
Mitchell..........	13,886	124,974	49,989 60	6,562	236,232	99,217.44
Montgomery........	33,728	539,648	210,462.72	22,207	755,038	286,914.44
Morris............	12,239	220,302	88,120.80	5,179	129,475	51,790.00
Morton............	144	....	....	97	2,231	937.02
Nemaha............	33,574	470,036	178,613.68	31,426	974,206	331,230.04
Neosho............	22,759	113,795	45,518.00	10,505	273,130	101,058.10
Ness..............	19,760	....	....	14,801	429,229	163,107.02
Norton............	10,255	....	....	10,912	141,856	59,579.52
Osage.............	19,960	259,480	103,792.00	7,393	243,969	90,268.53
Osborne...........	14,182	....	....	4,852	155,264	65,210 88
Ottawa............	14,067	281,340	101,282.40	10,467	303,543	124,452.62
Pawnee............	19,286	347,148	142,330.68	22,954	688,620	261,675.60

OATS—CONCLUDED.

COUNTIES.	1911.			1912.		
	Acres.	Bushels.	Value.	Acres.	Bushels.	Value.
Phillips	16,802	....	....	10,734	257,616	$103,046.40
Pottawatomie	17,158	291,686	$119,591.26	10,411	364,385	145,754.00
Pratt	17,035	374,770	149,908.00	19,966	459,218	174,502.84
Rawlins	9,066	....	....	7,759	131,903	51,442.17
Reno	44,016	836,304	334,521.60	32,235	805,875	330,408.75
Republic	39,346	354,114	141,645.60	25,095	677,565	257,474.70
Rice	22,669	385,373	154,149.20	24,973	674,271	276,451.11
Riley	17,566	333,754	126,826.52	13,050	378,450	151,380.00
Rooks	14,941	29,882	14,343.36	7,024	252,864	101,145.60
Rush	23,448	234,480	93,792.00	18,869	566,070	220,767.30
Russell	11,559	34,677	15,951.42	10,325	289,100	127,204.00
Saline	12,032	216,576	86,630.40	7,984	199,600	81,836.00
Scott	5,687	....	....	3,960	55,440	22,176.00
Sedgwick	77,706	1,554,120	575,024.40	53.955	1,456,785	568,146.15
Seward	3,143	31,430	15,715.00	1,399	27,980	11,471.80
Shawnee	11,601	232,020	97,448 40	4,548	150,084	58,532.76
Sheridan	14,177	....	....	16,010	192,120	76,848.00
Sherman	1,463	....	....	2,823	76,221	28,201.77
Smith	17,267	69,068	31,080.60	7,634	297,726	110,158.62
Stafford	11,506	241,626	101,482.92	17,957	538,710	210,096.90
Stanton	12	....	....	37	666	273.06
Stevens	1,062	9,558	4,779.00	346	7,266	2,979.06
Sumner	157,303	3,775,272	1,359,097.92	108,476	3,362,756	1,210,592.16
Thomas	12,959	....	....	18,229	236,977	94,790.80
Trego	17,517	....	....	12,919	180,866	81,389.70
Wabaunsee	9,907	138,698	55,479.20	4,912	152,272	59,386.08
Wallace	792	....	....	1,159	17,385	7,475.55
Washington	49,608	446,472	191,982.96	41,971	1,217,159	474,692.01
Wichita	1,621	....	....	1,405	16,860	7,249.80
Wilson	15,283	229,245	96,282.90	5,602	196,070	78,428.00
Woodson	12,146	145,752	59,758.32	4,179	117,012	46,804.80
Wyandotte	2,407	24,070	10,831.50	1,372	53,508	22,473.36

RYE.

TABLE showing the number of acres, product and value for the years 1911 and 1912.

COUNTIES.	1911.			1912.		
	Acres.	Bushels.	Value.	Acres.	Bushels.	Value.
The State	30,559	250,265	$207,960.89	36,399	545,658	$389,245.28
Allen	189	2,835	$2,268.00	366	5,490	$4,117.50
Anderson	171	2,736	2,188.80	263	3,945	2,958.75
Atchison	117	2,106	1,790.10	512	10,240	7,168.00
Barber	84	504	403.20	359	4,667	3,313.57
Barton	130	1,430	1,144.00	179	2,506	1,754.20
Bourbon	14	210	168.00	29	435	326.25
Brown	107	1,819	1,546.15	283	4,245	2,971.50
Butler	183	3,660	3,111.00	347	6,593	4,615.10
Chase	....	....	....	8	152	107.92
Chautauqua	154	2,310	1,963.50	67	1,340	1,005.00
Cherokee	62	620	527.00	2	30	22.50
Cheyenne	103	....	....	418	7,524	5,266.80
Clark	316	2,212	1,769.60	186	2,418	1,692.60
Clay	139	1,807	1,535.95	109	1,962	1,412.64
Cloud	35	420	357.00	36	648	460.08
Coffey	191	4,011	3,369.24	255	5,100	3,672.00
Comanche	743	7,430	5,944.00	632	8,848	6,193.60
Cowley	865	8,650	6,920.00	609	12,180	8,769.60
Crawford	44	440	352.00	....	....	....
Decatur	492	....	....	142	994	695.80
Dickinson	308	4,620	3,927.00	556	10,008	7,005.60
Doniphan	175	3,325	2,826.25	304	5,472	3,885.12
Douglas	124	2,232	1,897.20	491	11,293	8,469.75
Edwards	307	2,763	2,210.40	191	2,865	2,034.15
Elk	18	270	224.10	2	38	27.74
Ellis	69	....	....	150	1,800	1,278.00
Ellsworth	205	820	656.00	260	4,420	3,094.00
Finney	149	745	618.35	55	715	500.50
Ford	835	6,680	5,611.20	338	5,070	3,549.00

RYE—CONCLUDED.

COUNTIES.	1911.			1912.		
	Acres.	Bushels.	Value.	Acres.	Bushels.	Value.
Franklin	262	3,930	$3,340.50	569	9,673	$7,254.75
Geary	93	1,395	1,185.75	96	1,920	1,363.20
Gove	210	....	....	126	1,260	882.00
Graham	62	124	105.40	1,122	11,220	7,854.00
Grant	112	....	....	90	720	504.00
Gray	728	4,368	3,712.80	282	2,820	1,974.00
Greeley	26	....	....	10	90	63.90
Greenwood	66	990	792.00	129	2,322	1,695.06
Hamilton	173	....	....	22	264	187.44
Harper	67	536	455.60	112	1,568	1,113.28
Harvey	813	9,756	7,804.80	992	14,880	10,416.00
Haskell	48	....	....	18	180	126.00
Hodgeman	1,921	....	....	1,099	15,386	10,770.20
Jackson	130	1,950	1,657.50	166	3,320	2,423.60
Jefferson	88	1,760	1,408.00	305	6,710	5,032.50
Jewell	75	450	369.00	173	2,941	2,088.11
Johnson	59	885	752 25	133	2,660	20,021.60
Kearny	107	535	449.40	80	1,120	795.20
Kingman	1,456	18,928	16,088.80	3,911	50,843	35,590.10
Kiowa	18	270	216.00	380	5,320	3,724.00
Labette	173	1,730	1,453.20	112	1,680	1,260.00
Lane	247	....	....	155	1,550	1,100.50
Leavenworth	142	2,130	1,810.50	206	4,738	3,458.74
Lincoln	14	70	59.50	203	3,654	2,557.80
Linn	262	4,454	3,785.90	499	7,984	6,067.84
Logan	227	....	....	321	3,210	2,279.10
Lyon	49	980	833.00	179	4,475	3,132.50
Marion	257	3,855	3,161.10	414	6,210	4,347.00
Marshall	42	420	357.00	142	2,130	1,491.00
McPherson	950	10,450	8,360.00	1,181	15,353	10,900.63
Meade	365	3,285	2,693.70	58	580	406.00
Miami	127	1,524	1,295.40	209	3,344	2,508.00
Mitchell	56	224	185.92	84	1,512	1,073.52
Montgomery	98	1,274	1,057.42	167	2,505	1,878.75
Morris	30	540	432.00	76	1,520	1,094.40
Morton	6	30	25.20	1	10	7.00
Nemaha	152	2,432	2,067.20	356	5,340	3,738.00
Neosho	120	1,200	1,008.00	78	1,170	865.80
Ness	2,757	....	....	1,861	20,471	14,329.70
Norton	360	....	....	59	531	377.01
Osage	124	1,984	1,686.40	307	5,219	3,862.06
Osborne	130	....	....	141	2.538	1,776.60
Ottawa	261	2,871	2,440.35	438	6.132	4,599.00
Pawnee	412	4,120	3,296.00	80	1.040	728.00
Phillips	257	514	436.90	80	960	681.60
Pottawatomie	66	1,056	876.48	35	805	595.70
Pratt	206	2,266	1,812.80	230	3,450	2.415.00
Rawlins	419	....	....	501	3.507	2,454.90
Reno	2,375	28,500	23,940.00	2,473	29,676	21,069.96
Republic	....	....	....	10	150	105.00
Rice	541	5,410	4,328.00	579	10,422	7,398.62
Riley	93	1,488	1,264.80	144	2,880	2,160.00
Rooks	35	....	....	24	288	201.60
Rush	....	....	....	15	180	126.00
Russell	30	....	....	254	3,556	2,489.20
Saline	142	2,272	1,931.20	349	4,537	3,312.01
Scott	36	....	....	250	2,250	1,597.50
Sedgwick	1,768	21,216	18,033.60	2,195	39,510	27,657.00
Seward	5	25	21.25	31	372	260.40
Shawnee	87	1,740	1,479.00	129	2,967	2,225.25
Sheridan	411	....	....	241	1,928	1,368.88
Sherman	425	....	....	236	2,832	1,982.40
Smith	24	144	118.08	55	825	585.75
Stafford	365	4,015	3,212.00	344	4,128	2,889.60
Stanton	....	....	....	2	18	12.60
Stevens	33	231	196.35	30	300	210.00
Sumner	1,855	22,260	18,475.80	2,724	54,480	39,225.60
Thomas	418	....	....	242	1,694	1,185.80
Trego	40	....	....	186	1,860	1,302.00
Wabaunsee	58	928	788.80	154	3,388	2,541.00
Wallace	133	....	....	41	369	261.99
Washington	52	572	486.20	75	1,125	787.50
Wichita	210	....	....	32	256	181.76
Wilson	167	2,171	1,736.80	313	5,634	4,225.50
Woodson	104	1,352	1,149.20	115	1,725	1,293.75
Wyandotte	....	....	....	19	475	356.25

BARLEY.

TABLE showing the number of acres, product and value for the years 1911 and 1912.

COUNTIES.	1911.			1912.		
	Acres.	Bushels.	Value.	Acres.	Bushels.	Value.
The State	311,538	1,437,169	$727,224.63	146,184	2,833,537	$1,202,241.95
Allen	1	16	$8.00	2	40	$18.00
Anderson	10	160	80.00	....	....	....
Atchison	126	2,520	1,260.00	60	1,680	756.00
Barber	93	1,209	604.50	142	2,982	1,341.90
Barton	2,165	41,135	20,567.50	1,417	42,510	19,129.50
Bourbon	11	176	88.00	....	....	....
Brown	631	13,882	7,635.10	126	3,402	1,462.86
Butler	....	....	....	61	1,525	686.25
Chase	....	....	....	....	....	....
Chautauqua	....	....	....	....	....	....
Cherokee	73	1,095	602.25	10	200	90.00
Cheyenne	18,526	....	....	12,030	288,720	118,375.20
Clark	8,448	152,064	76,032.00	1,622	32,440	15,246.80
Clay	....	....	....	....	....	....
Cloud	12	192	96.00	15	375	157.50
Coffey	5	125	68.75	....	....	....
Comanche	738	13,284	7,306.20	676	12,844	5,908.24
Cowley	25	375	206.25	....	....	....
Crawford	6	90	45.50	2	36	15.84
Decatur	12,809	....	....	4,374	34,992	15,396.48
Dickinson	240	3,600	1,800.00	62	1,550	651.00
Doniphan	253	5,819	3,200.45	143	4,719	2,123.55
Douglas	48	960	528.00	....	....	....
Edwards	10,086	171,462	85,731.00	3,365	94,220	42,399.00
Elk	....	....	....	....	....	....
Ellis	4,810	....	....	704	14,080	5,632.00
Ellsworth	527	2,635	1,449.25	354	8,850	3,894.00
Finney	3,925	43,175	21,587.50	3,493	69,860	29,341.20
Ford	19,607	254,891	127,445.50	7,922	190,128	91,261.44
Franklin	82	1,640	902.00	....	....	....
Geary	10	180	99.00	....	....	....
Gove	4,259	....	....	2,252	22,520	9,008.00
Graham	1,615	....	....	710	7,810	3,280.20
Grant	579	2,895	1,592.25	188	4,324	1,945.80
Gray	6,258	62,580	31,290.00	2,988	74,700	33,615 00
Greeley	483	....	....	602	8,428	4,214.00
Greenwood	2	50	25.00	....	....	....
Hamilton	225	1,125	618.75	478	9,560	4,302.00
Harper	156	1,560	858.00	196	3,724	1,675.80
Harvey	1,031	16,496	9.072.80	350	8,750	3,762.50
Haskell	1,929	11,574	5,902.74	1,022	18,396	7,358.40
Hodgeman	8,723	43,615	24,424.40	6,106	146,544	60 083.04
Jackson	31	558	306.90	2	50	22.50
Jefferson	34	748	374.00	5	130	58.50
Jewell	30	....	....	100	2,500	1,125.00
Johnson	103	1,854	1,019.70	25	700	315.00
Kearny	1,841	11,046	5,523.00	1,596	33,516	15,417.36
Kingman	35	420	210.00	48	1,056	475.20
Kiowa	4,915	73,725	36,862.50	2,158	53,950	24,277.50
Labette	53	848	466.40	3	60	27.00
Lane	4,948	9,896	5,541.76	3,490	73,290	29,316.00
Leavenworth	176	3,344	1,839.20	33	924	425.04
Lincoln	42	210	115.50	26	650	292.50
Linn	39	585	321.75	8	184	82.80
Logan	6,786	....	....	3,987	39,870	17,144.10
Lyon	....	....	....	10	280	120.40
Marion	373	7,460	3,879.20	....	....	....
Marshall	....	....	....	....	....	....
McPherson	2,809	36,517	19,354.01	1,339	33,475	13,390.00
Meade	12,145	133,595	65,461.55	7,008	154,176	69,379.20
Miami	49	882	485.10	28	700	315.00
Mitchell	40	400	208.00	10	250	112.50
Montgomery	2	36	19.80	....	....	....
Morris	....	....	....	38	950	427.50
Morton	128	640	352.00	267	6,942	3,332.16
Nemaha	150	3,000	1,650.00	70	1,400	630.00
Neosho	13	260	143.00	57	1,140	513.60
Ness	12,966	....	....	3,429	65,151	27,363.42
Norton	1,023	....	....	136	1,360	584.80
Osage	48	1,200	624.00	....	....	....
Osborne	9,681	....	....	10	220	96.80
Ottawa	23	276	138.00	15	375	161.25
Pawnee	4,623	78,591	39,295.50	3,570	85,680	35,128.80

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BARLEY—CONCLUDED.

COUNTIES.	1911.			1912.		
	Acres.	Bushels.	Value.	Acres.	Bushels.	Value.
Phillips	1,164	3,492	$1,955.52	145	1,740	$783.00
Pottawatomie	42	1,050	525.00			
Pratt	3,331	53,296	26,648.00	1,179	25,938	11,153.34
Rawlins	26,741			12,695	253,900	104,099.00
Reno	958	14,370	7,472.40	201	5,628	2,532.60
Republic	15	180	93.60			
Rice	291	3,201	1,600.50	128	3,328	1,431.04
Riley	45	900	495.00			
Rooks	102			148	2,960	1,272.80
Rush	7,790	93,480	46,740.00	1,288	33,488	14,734.72
Russell	186			120	3,000	1,290.00
Saline	657	11,826	6,149.52	80	2,000	860.00
Scott	3,243	12,972	7,134.60	1,875	22,500	9,450.00
Sedgwick	54	756	393.12	114	2,736	1,203.84
Seward	1,627	11,389	5,694.50	1,169	24,549	10,801.56
Shawnee	19	418	229.90	8	200	90.00
Sheridan	21,902			7,299	80,289	32,115.60
Sherman	18,782			12,255	306,375	122,550.00
Smith	62	496	277.76	43	860	387.00
Stafford	97	1,843	1,013.65	109	2,725	1,199.00
Stanton	230	1,150	632.50	136	2,448	1,101.60
Stevens	888	7,104	552.00	616	14,168	6,375.60
Sumner	153	2,295	1,147.50	130	3,120	1,404.00
Thomas	40,358			20,521	307,815	123,126.00
Trego	2,687			700	11,200	4,592.00
Wabaunsee	6	120	60.00	17	374	160.82
Wallace	1,663			1,582	15,820	7,119.00
Washington	10	160	88.00			
Wichita	6,852			4,686	37,488	18,744.00
Wilson						
Woodson						
Wyandotte						

EMMER ("SPELTZ").

Table showing the number of acres, product and value for the years 1911 and 1912.

COUNTIES.	1911.			1912.		
	Acres.	Bushels.	Value.	Acres.	Bushels.	Value.
The State	31,404	78,985	$37,355.31	10,378	146,282	$71,443.72
Allen	81	1,296	$583.20			
Anderson	36	540	259.20	30	600	$270.00
Atchison	19	475	218.75			
Barber						
Barton	80	960	441.60	53	1,113	523.11
Bourbon	24	360	162.00			
Brown	190	3,800	1,710.00	34	850	357.00
Butler				6	162	74.52
Chase						
Chautauqua	6	90	43.20			
Cherokee	20	400	180.00			
Cheyenne	215			221	5,083	2,439.84
Clark	151	906	453.00			
Clay	57	1,140	513.00			
Cloud						
Coffey	40	600	270.00			
Comanche				10	200	96.00
Cowley						
Crawford						
Decatur	55					
Dickinson	28	476	218.96	5	135	60.75
Doniphan	6	150	67.50			
Douglas						
Edwards	15	180	82.80			
Elk	15	270	121.50			
Ellis						
Ellsworth	182	910	455.00	56	1,232	591.36
Finney	739			398	7,960	3,741.20
Ford	685	8,905	4,274.40	2	40	19.20

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EMMER ("SPELTZ") – CONCLUDED.

COUNTIES.	1911.			1912.		
	Acres.	Bushels.	Value.	Acres.	Bushels.	Value.
Franklin	35	525	$236.25			
Geary				10	260	$119.60
Gove	10,228			4,456	53,472	26,736.00
Graham	327			180	2,160	1,058.40
Grant	23			5	90	43.20
Gray	1,365	6,825	3,276.00	180	4,140	1,904.40
Greeley	16			7	77	37.73
Greenwood	20	400	180.00			
Hamilton	71	213	106.50	17	255	122.40
Harper						
Harvey	21	315	141.75			
Haskell	96	480	240.00	8	136	68.00
Hodgeman	1,868	7,472	3,736.00	435	8,265	3,967.20
Jackson	48	864	388.80			
Jefferson	4	80	36.00			
Jewell						
Johnson						
Kearny	141	423	211.50	15	300	144.00
Kingman						
Kiowa						
Labette						
Lane	1,538			323	3,876	1,938.00
Leavenworth						
Lincoln	65			47	940	451.20
Linn	17	255	114.75	2	42	18.90
Logan	4,208			1,743	20,916	10,458.00
Lyon				8	200	92.00
Marion	25	450	207.00	5	150	69.00
Marshall	90	1,350	607.50	60	1,200	516.00
McPherson	30	450	202.50			
Meade	1,332	7,992	3,996.00	312	6,552	3,144.96
Miami	41	492	221.40			
Mitchell	10	100	48 00	15	330	158.40
Montgomery	46	838	372.60	1	20	9.00
Morris	26	520	234.00			
Norton	50			65	1,170	585.00
Nemaha	126	2,268	952.56	54	1,026	430.92
Neosho	4	60	27.00			
Ness	376			10	180	84.60
Norton	50					
Osage	42	630	283.50	60	1,320	594.00
Osborne	36					
Ottawa	20	300	135.00	6	144	67.68
Pawnee	660	9,240	4,158.00	113	2,260	1,039.60
Phillips						
Pottawatomie						
Pratt						
Rawlins	84			3	48	23.04
Reno	145	2,175	978.75	30	750	345.00
Republic						
Rice	23	230	101.20	10	230	105.80
Riley				5	120	54.00
Rooks	25					
Rush	494	2,470	1,136.20	49	980	450.80
Russell	21			4	84	40.32
Saline	12	168	75.60	5	115	54.05
Scott	106			25	275	137.50
Sedgwick						
Seward	373	2,238	1,119.00	118	2,360	1,132.80
Shawnee	28	700	315.00			
Sheridan	2,007			625	6,250	3,062.50
Sherman	284			40	920	423.20
Smith	27	216	95.04			
Stafford	10	140	64.40	14	308	141.68
Stanton	71			100	1,700	850.00
Stevens	771	6,168	3,084.00	55	1,100	539.00
Sumner	10	100	45.00			
Thomas	246			104	1,040	509.60
Trego	681			171	2,052	1,026.00
Wabaunsee				15	375	168.75
Wallace	197			48	624	305.76
Washington	10	150	69.00	5	95	42.75
Wichita	68					
Wilson	12	240	110.40			
Woodson						
Wyandotte						

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BUCKWHEAT.

TABLE showing the number of acres, product and value for the years 1911 and 1912.

COUNTIES.	1911.			1912.		
	Acres.	Bushels.	Value.	Acres.	Bushels.	Value.
The State	203	1,299	$1,299.00	356	4,377	$4,377.00
Allen	15	120	$120.00			
Anderson	1	7	7.00	148	2,072	$2,072.00
Atchison						
Barber						
Barton				1	9	9.00
Bourbon				2	22	22.00
Brown						
Butler				2	20	20.00
Chase						
Chautauqua	1	6	6.00			
Cherokee	2	14	14.00	57	627	627.00
Cheyenne	3					
Clark						
Clay						
Cloud						
Coffey				20	260	260.00
Comanche				16	128	128.00
Cowley	4	28	28.00			
Crawford	4	24	24.00	6	60	60.00
Decatur						
Dickinson						
Doniphan	1	10	10.00			
Douglas						
Edwards						
Elk				1	10	10.00
Ellis				10	80	80.00
Ellsworth						
Finney						
Ford						
Franklin						
Geary				2	24	24.00
Gove						
Graham						
Grant						
Gray						
Greeley						
Greenwood						
Hamilton	1					
Harper						
Harvey	15	135	135.00			
Haskell						
Hodgeman						
Jackson	1	10	10.00			
Jefferson				4	48	48.00
Jewell						
Johnson	28	280	280.00	55	715	715.00
Kearny						
Kingman						
Kiowa						
Labette	3	24	24.00	22	198	198.00
Lane						
Leavenworth						
Lincoln						
Linn	10	80	80.00	4	48	48.00
Logan						
Lyon						
Marion						
Marshall	15	90	90.00			
McPherson						
Meade						
Miami						
Mitchell						
Montgomery						
Morris						
Morton						
Nemaha	9	81	81.00			
Neosho						
Ness						
Norton	1					
Osage						
Osborne						
Ottawa						
Pawnee						

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BUCKWHEAT—CONCLUDED.

COUNTIES.	1911.			1912.		
	Acres.	Bushels.	Value.	Acres.	Bushels.	Value.
Phillips						
Pottawatomie	25	200	$200.00			
Pratt						
Rawlins				2	16	$16.00
Reno	10	80	80.00			
Republic						
Rice						
Riley						
Rooks						
Rush						
Russell						
Saline						
Scott						
Sedgwick						
Seward						
Shawnee	1	10	10.00	1	11	11.00
Sheridan						
Sherman						
Smith	23					
Stafford	5	40	40.00	2	20	20 00
Stanton						
Stevens						
Sumner						
Thomas	15					
Trego						
Wabaunsee						
Wallace						
Washington	10	60	60.00	1	9	9.00
Wichita						
Wilson						
Woodson						
Wyandotte						

IRISH POTATOES.

TABLE showing the number of acres, product and value for the years 1911 and 1912.

COUNTIES.	1911.			1912.		
	Acres.	Bushels.	Value.	Acres.	Bushels.	Value.
The State	78,137	1,966,029	$1,899,067.88	56,656	4,727,823	$3,438,261.46
Allen	913	23,738	$23,738.00	718	49,542	$36,165.66
Anderson	574	14,350	14,637.00	536	48,240	37,144.80
Atchison	1,722	48,216	46,287.36	901	74,783	46,365.46
Barber	237	4,740	4,977.00	193	17,370	14,243.40
Barton	714	22,134	26,118 12	893	81,263	66,635.66
Bourbon	764	16,808	16,808.00	540	45,900	33,507.00
Brown	1,041	39,558	39,953.58	1,111	87,769	60,560.61
Butler	1,409	36,634	36,634.00	895	67,125	53,700.00
Chase	553	10,507	11,137.42	346	25,258	20,206.40
Chautauqua	532	6,916	6,916.00	270	13,500	10,800.00
Cherokee	769	11,535	14,418.75	707	35,350	25,805.50
Cheyenne	499	2,495	2,495.00	318	27,666	20,749.50
Clark	140	4,900	6,125.00	78	5,460	4,914.00
Clay	865	22,490	24,064.30	695	56,990	41,602.70
Cloud	1,068	28,836	28,836.00	896	79,744	63,795.20
Coffey	878	21,950	21,511.00	710	71,000	54,670.00
Comanche	107	2,675	2,942.50	116	9,860	8,381 00
Cowley	946	18,920	18,920.00	695	59,075	46,078.50
Crawford	465	6,975	6,975.00	377	21,489	15,686.97
Decatur	662			381	22,098	17,678.40
Dickinson	1,085	21,700	20,615.00	1,110	98,790	74,092.50
Doniphan	1,195	34,655	32,575.70	1,095	114,975	73,584.00
Douglas	1,670	90,180	77,554.80	1,419	167,442	98,790.78
Edwards	164	2,460	3,075.00	147	9,555	8,599.50
Elk	322	4,508	4,508.00	408	22,848	18,735.36
Ellis	946			676	32,448	26,282.88
Ellsworth	594	7,128	7,912.08	496	30,256	24,507.36
Finney	56	1,680	1,680.00	37	1,885	1,696.50
Ford	393	9,432	10,658.16	222	17,982	16,183.80

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IRISH POTATOES.—CONCLUDED.

COUNTIES.	1911.			1912.		
	Acres.	Bushels.	Value.	Acres.	Bushels.	Value.
Franklin	723	20,967	$18,870.30	540	51,840	$34,732.80
Geary	759	15,939	16,257.78	410	42,230	31,672.50
Gove	265	....	....	137	6,576	5,589.60
Graham	655	....	....	483	29,463	25,632.80
Grant	10	100	125.00	10	480	456.00
Gray	61	1,403	1,403.00	26	1,508	1,337.04
Greeley	14	392	490.00	....	....	....
Greenwood	997	32,901	32,901.00	725	56,550	45,240.00
Hamilton	30	450	562.50	15	750	675.00
Harper	364	5,460	6,279.00	348	31,320	25,056.00
Harvey	512	12,800	13,824.00	522	33,408	27,060.48
Haskell	11	143	178.75	1	40	36.00
Hodgeman	194	3,880	4,850.00	120	7,320	6,588.00
Jackson	1,037	30,073	30,073.00	857	75,416	49,020.40
Jefferson	1,137	48,891	40,579.53	905	104,980	62,988.00
Jewell	1,785	26,775	26,507.25	1,294	100,932	79,736.28
Johnson	2,101	77,737	69,963.30	1,962	235,440	138,909.60
Kearny	37	592	698.56	9	540	486.00
Kingman	357	7,140	8,710.80	281	28,100	22,480.00
Kiowa	101	3,333	4,166.25	77	4,851	4,123.35
Labette	544	8,160	8,160.00	310	18,600	14,880.00
Lane	158	....	....	105	4,620	4,158.00
Leavenworth	2,107	80,066	70,458.08	1,473	160,557	104,362.05
Lincoln	674	8,088	8,249.76	484	39,688	32,147.28
Linn	580	9,860	9,367.00	388	19,400	14,550.00
Logan	196	....	....	121	8,228	7,076.08
Lyon	1,424	25,632	25,632.00	1,140	78,660	58,208.40
Marion	848	20,352	23,608.32	751	52,570	39,953.20
Marshall	1,517	42,476	46,723.60	1,358	101,850	71,295.00
McPherson	898	12,572	14,080.64	783	49,329	39,463.20
Meade	111	3,774	4,717.50	93	9,207	8,286.30
Miami	554	11,634	11,168.64	526	52,600	34,190.00
Mitchell	1,223	13,453	13,587.53	671	48,312	37,683.36
Montgomery	519	11,937	11,937.00	381	19,812	16,245.84
Morris	724	15,928	18,317.20	523	44,978	33,283.72
Morton	2	30	37.50	7	315	299.25
Nemaha	1,321	27,741	26,908.77	1,346	100,950	72,684.00
Neosho	613	20,842	20,842.00	406	28,826	21,042.98
Ness	340	1,360	1,536.80	95	7,410	6,743.10
Norton	902	9,020	8,569.00	710	44,730	36,231.30
Osage	887	15,079	13,571.10	733	64,504	43,217.68
Osborne	911	....	....	614	46,050	37,300.50
Ottawa	610	9,150	11,986.50	445	32,485	25,988.00
Pawnee	445	10,680	10,680.00	252	22,680	20,412.00
Phillips	1,264	15,168	16,078.08	874	58,558	46,846.40
Pottawatomie	1,214	33,992	31,272.64	930	107,880	70,122.00
Pratt	170	7,480	9,350.00	121	8,833	7,508.05
Rawlins	560	3,360	3,393.60	325	18,525	14,820.00
Reno	923	13,845	17,306.25	1,490	111,750	88,282.50
Republic	1,244	8,708	8,969.24	1,057	87,731	70,184.80
Rice	508	6,096	6,522.72	430	24,360	19,244.40
Riley	998	19,960	19,960.00	667	62,031	43,421.70
Rooks	774	....	....	519	40,482	32,385.60
Rush	312	6,240	6,240.00	258	15,996	13,756.56
Russell	515	....	....	354	29,382	23,799.42
Saline	772	12,352	13,957.76	576	48,384	36,288.00
Scott	86	344	419.68	79	3,555	3,199.50
Sedgwick	1,501	21,014	25,006.66	991	78,289	62,631.20
Seward	84	1,932	2,415.00	110	8,800	7,920.00
Shawnee	1,362	95,340	80,085.60	1,026	141,588	83,536.92
Sheridan	351	....	....	219	10,950	9,636.00
Sherman	356	....	....	275	21,725	16,293.75
Smith	1,521	31,941	32,579.82	1,243	87,010	65,257.50
Stafford	276	3,864	4,830.00	248	16,120	13,702.00
Stanton	4	40	50.00	1	50	47.50
Stevens	5	125	156.25	....	....	....
Sumner	806	8,060	9,833.20	558	49,662	39,729.60
Thomas	395	....	....	228	18,012	14,769.84
Trego	219	....	....	182	8,736	7,862.40
Wabaunsee	930	35,340	35,340.00	885	74,340	50,551.20
Wallace	202	....	....	62	4,154	3,530.90
Washington	1,509	34,707	32,971.65	1,179	84,888	61,968.24
Wichita	27	....	....	65	2,600	2,340.00
Wilson	751	12,016	12,616.80	503	25,150	20,120.00
Woodson	678	16,272	15,946.56	513	42,579	34,063.20
Wyandotte	7,279	414,903	365,114.64	1,255	171,935	111,757.7

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SWEET POTATOES.

TABLE showing the number of acres, product and value for the years 1911 and 1912.

COUNTIES.	1911.			1912.		
	Acres.	Bushels.	Value.	Acres.	Bushels.	Value.
The State	3,561	294,409	$300,995.36	3,783	447,702	$364,695.52
Allen	7	350	$437.50	11	759	$759.00
Anderson	5	300	375.00	5	490	490.00
Atchison	44	3,300	3,630.00	45	3,870	3,483.00
Barber	10	500	625.00	16	1,360	1,360.00
Barton	8	528	660.00	13	1,144	1,292.72
Bourbon	....	....	....	7	651	651.00
Brown	9	585	731.25	3	285	256.50
Butler	6	300	300.00	2	170	170.00
Chase	....	....	....	....	....	....
Chautauqua	45	2,250	2,812.50	21	1,470	1,470.00
Cherokee	260	14,820	22,230 00	151	11,325	11,325.00
Cheyenne	5	100	125.00	3	240	240.00
Clark	7	420	546.00	5	425	425.00
Clay	1	97	121.25	1	100	100.00
Cloud	2	146	182.50	3	270	270.00
Coffey	38	2,280	2,850.00	....	....	....
Comanche	1	80	100.00	3	300	300.00
Cowley	70	3,780	4,422.60	69	5,037	5.037.00
Crawford	32	960	1,200.00	28	2,100	2,100.00
Decatur	1	20	25.00	....	....	....
Dickinson	182	18,200	18,200.00	8	800	720.00
Doniphan	2	200	250.00	7	791	711.90
Douglas	57	5,700	5,187.00	102	13,260	10,608.00
Edwards	....	....	....	2	170	161.50
Elk	1	48	60.00	....	....	....
Ellis	....	....	....	....	....	....
Ellsworth	6	240	288.00	4	332	332.00
Finney	27	2,700	2,700.00	48	5,760	5,760.00
Ford	1	40	50.00	3	240	240.00
Franklin	1	69	69.69	....	....	....
Geary	2	138	150.42	4	500	425.00
Gove	....	....	....	....	....	....
Graham	5	125	156.25	7	350	350.00
Grant	1	60	75.00	....	....	....
Gray	6	240	300.00	2	210	210 00
Greeley	....	....	....	....	....	....
Greenwood	3	105	131.25	5	400	400.00
Hamilton	....	....	....	....	....	....
Harper	14	1,050	1,312.50	18	1,800	1,710.00
Harvey	48	3,024	3,780.00	59	7,375	6,637.50
Haskell	....	....	....	....	....	....
Hodgeman	1	40	50.00	4	352	352.00
Jackson	....	....	....	3	276	220.80
Jefferson	5	390	339.30	16	1,840	1,472.00
Jewell	1	23	28.75	....	....	....
Johnson	143	10,010	9,509.50	113	14,690	12,633.40
Kearny	....	....	....	1	100	100.00
Kingman	4	424	534.24	6	600	600.00
Kiowa	1	70	87.50	....	....	....
Labette	110	6,160	7,700.00	110	6,380	6,380.00
Lane	....	....	....	....	....	....
Leavenworth	39	2,925	2,954.25	41	4,756	4,280.40
Lincoln	....	....	....	....	....	....
Linn	6	300	375.00	3	225	225.00
Logan	....	....	....	1	50	50.00
Lyon	54	2,592	3,214.08	39	3,705	3,334.50
Marion	3	114	137.94	....	....	....
Marshall	....	....	....	....	....	....
McPherson	2	98	117.60	2	168	157.92
Meade	8	504	630.00	4	340	340.00
Miami	11	693	866.25	14	1,400	1,260.00
Mitchell	....	....	....	....	....	....
Montgomery	67	3,551	4,438.75	26	1,898	1,898.00
Morris	1	48	60.00	1	98	88.20
Morton	....	....	....	1	70	70.00
Nemaha	3	120	150.00	5	500	450.00
Neosho	19	1,368	1,710.00	25	2,500	2,500.00
Ness	....	....	....	4	400	400.00
Norton	3	60	75.00	....	....	....
Osage	6	480	470.40	1	75	63.75
Osborne	....	....	....	....	....	....
Ottawa	7	700	875.00	8	664	664.00
Pawnee	1	69	86.25	5	540	540.00

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SWEET POTATOES—CONCLUDED.

COUNTIES.	1911.			1912.		
	Acres.	Bushels.	Value.	Acres.	Bushels.	Value.
Phillips	......	......	......	......	......	......
Pottawatomie	398	44,576	$39,226.88	462	59,598	$44,698.50
Pratt	2	150	187.50	2	118	118.00
Rawlins	......	......	......	1	70	70.00
Reno	112	8,400	10,500.00	162	17,820	15,147.00
Republic	......	......	......	......	......	......
Rice	18	1,260	1,638.00	11	1,155	1,039.50
Riley	52	3,482	3,760.56	99	9,900	7,920.00
Rooks	......	......	......	1	88	99.44
Rush	......	......	......	......	......	......
Russell	......	......	......	......	......	......
Saline	......	......	......	4	400	400.00
Scott	3	75	90.00	1	75	75.00
Sedgwick	521	36,991	36,991.00	890	104,130	78,097.50
Seward	1	40	60.00	2	150	150.00
Shawnee	265	29,150	25,943.50	359	49,901	37,425.75
Sheridan	......	......	......	......	......	......
Sherman	......	......	......	......	......	......
Smith	......	......	......	......	......	......
Stafford	......	......	......	11	990	891.00
Stanton	......	......	......	......	......	......
Stevens	......	......	......	1	75	93.75
Sumner	70	7,000	7,910.00	49	6,076	5,468.40
Thomas	......	......	......	......	......	......
Trego	......	......	......	......	......	......
Wabaunsee	402	40,200	36,180.00	386	56,742	43,691.34
Wallace	......	......	......	......	......	......
Washington	6	270	337.50	3	255	242.25
Wichita	......	......	......	1	50	50.00
Wilson	3	78	101.40	7	420	420.00
Woodson	35	1,330	1,662.50	6	528	528.00
Wyandotte	271	27,913	27,913.00	237	35,550	31,995.00

FLAX.

TABLE showing the number of acres, product and value for the years 1911 and 1912.

COUNTIES.	1911.			1912.		
	Acres.	Bushels.	Value.	Acres.	Bushels.	Value.
The State	108,181	364,998	$650,543.90	48,942	306,748	$460,122.00
Allen	11,910	41,685	$75,033.00	6,051	36,306	$54,459.00
Anderson	6,425	25,700	44,975.00	3,034	22,755	34,132.50
Atchison	......	......	......	......	......	......
Barber	......	......	......	......	......	......
Barton	......	......	......	......	......	......
Bourbon	8,396	25,188	45,338.40	5,339	32,034	48,051.00
Brown	......	......	......	......	......	......
Butler	681	2,724	4,767.00	114	684	1,026.00
Chase	......	......	......	......	......	......
Chautauqua	579	2,027	3,547.25	170	1,020	1,530.00
Cherokee	789	2,367	4,260.60	65	390	585.00
Cheyenne	30	......	......	......	......	......
Clark	......	......	......	......	......	......
Clay	......	......	......	......	......	......
Cloud	......	......	......	......	......	......
Coffey	9,173	27,519	49,534.20	5,408	32,448	48,672.00
Comanche	......	......	......	......	......	......
Cowley	106	371	649.25	......	......	......
Crawford	4,935	14,805	26,649.00	1,939	9,695	14,542.50
Decatur	......	......	......	......	......	......
Dickinson	......	......	......	5	35	52.50
Doniphan	......	......	......	......	......	......
Douglas	1,392	6,960	12,180.00	576	4,608	6,912.00
Edwards	......	......	......	......	......	......
Elk	2,545	10,180	17,815.00	407	2,035	3,052.50
Ellis	5	......	......	......	......	......
Ellsworth	......	......	......	......	......	......
Finney	10	......	......	4	24	36.00
Ford	......	......	......	......	......	......

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FLAX – CONCLUDED.

COUNTIES.	1911.			1912.		
	Acres.	Bushels.	Value.	Acres.	Bushels.	Value.
Franklin	4,453	13,359	$24,046.20	1,992	15,936	$23,904.00
Geary						
Gove						
Graham						
Grant						
Gray						
Greeley						
Greenwood	1,409	4,932	8,877.60	115	805	1,207.50
Hamilton	2					
Harper						
Harvey	51	153	275.40	10	70	105.00
Haskell						
Hodgeman	185					
Jackson	8	40	70.00			
Jefferson	152	760	1,330.00	80	640	960.00
Jewell						
Johnson	1,624	8,120	14,616.00	445	3,560	5,340.00
Kearny	5			5	30	45.00
Kingman						
Kiowa						
Labette	755	2,265	4,077.00	642	4,494	6,741.00
Lane						
Leavenworth	75	375	656.25			
Lincoln						
Linn	9,362	37,448	63,661.60	6,658	46,606	69,909.00
Logan						
Lyon	3,262	9,786	17,614.80	976	5,856	8,784.00
Marion	20	60	108.00			
Marshall	38	152	273.60	18	108	162.00
McPherson						
Meade						
Miami	5,530	22,120	39,816.00	2,332	16,324	24,486.00
Mitchell						
Montgomery	1,111	3,889	6,805.75	283	1,981	2,971.50
Morris	247	741	1,333.80			
Morton						
Nemaha	5	25	43.75			
Neosho	15,083	45,249	81,448.20	6,713	33,565	50,347.50
Ness						
Norton				4	20	30.00
Osage	4,529	15,852	28,533.60	1,373	9,611	14,416.50
Osborne						
Ottawa						
Pawnee						
Phillips						
Pottawatomie				27	216	324.00
Pratt						
Rawlins						
Reno						
Republic						
Rice						
Riley						
Rooks						
Rush						
Russell						
Saline						
Scott						
Sedgwick	30	105	189.00	5	40	60.00
Seward						
Shawnee				2	16	24.00
Sheridan				20	80	120.00
Sherman						
Smith						
Stafford						
Stanton						
Stevens						
Sumner	49	147	256.25			
Thomas						
Trego						
Wabaunsee	234	936	1,638.00	70	420	630.00
Wallace				12	48	72.00
Washington						
Wichita						
Wilson	11,550	34,650	62,370.00	3,952	23,712	35,568.00
Woodson	1,436	4,308	7,754.40	96	576	864.00
Wyandotte						

BROOM CORN.

TABLE showing the number of acres, product and value for the years 1911 and 1912.

COUNTIES.	1911.			1912.		
	Acres.	Pounds.	Value.	Acres.	Pounds.	Value.
The State	55,963	14,894,375	$897,398.50	68,725	28,230,584	$894,736.60
Allen	1,095	657,000	$42,705.00	2,049	1,178,175	$47,127.00
Anderson	4	2,000	130.00	7	3,500	140.00
Atchison						
Barber				52	26,000	910.00
Barton						
Bourbon	50	25,000	1,750.00	11	6,600	280.50
Brown						
Butler	25	10,000	650.00	8	4,400	176.00
Chase						
Chautauqua	5	2,000	130.00			
Cherokee	29	13,050	848.25	22	11,000	440.00
Cheyenne	1,620	202,500	9,112.50	1,902	833,076	18,744.21
Clark	125	43,750	2,625.00	320	160,000	4,000.00
Clay						
Cloud	15	6,000	390.00	16	8,000	320.00
Coffey	9	3,600	252.00	3	1,500	60.00
Comanche	210	68,250	4,436.25	280	140,000	4,200.00
Cowley	29	10,150	659.75			
Crawford	15	5,250	341.25	21	12,600	535.50
Decatur	15	1,500	75.00	21	7,350	183.75
Dickinson	32	12,800	896.00			
Doniphan	8	4,000	260.00	10	7,000	315.00
Douglas						
Edwards						
Elk	65	26,000	1,690.00	70	31,500	1,260.00
Ellis						
Ellsworth				18	9,000	360.00
Finney	665	199,500	10,972.50	1,143	571,500	17,145.00
Ford	15	4,500	270.00	60	24,000	720.00
Franklin				25	13,750	618.75
Geary						
Gove	15	1,500	75.00	35	14,000	350.00
Graham	10	1,500	82.50	18	6,300	189.00
Grant	3,950	493,750	27,156.25	3,189	1,116,150	27,903.75
Gray	737	257,950	15,477.00	762	342,900	10,287.00
Greeley	1,220	183,000	9,150.00	973	389,200	15,568.00
Greenwood				10	5,000	200.00
Hamilton	5,641	564,100	25,384.50	5,509	2,203,600	66,108.00
Harper	6	2,400	156.00	22	11,000	385.00
Harvey	5	2,000	140.00			
Haskell	357	107,100	6,426.00	380	171,000	3,990.00
Hodgeman	95	9,500	570.00	45	20,250	607.50
Jackson						
Jefferson				1	650	29.25
Jewell				20	11,000	495.00
Johnson	1	500	32.50			
Kearny	5,008	751,200	37,560.00	4,581	1,717,875	51,536.25
Kingman				91	45,500	1,820.00
Kiowa				5	2,250	67.50
Labette	297	148,500	10,395.00	407	183,150	7,326.00
Lane	265	53,000	2,915.00	10	4,000	100.00
Leavenworth	20	10,000	650.00			
Lincoln	1	200	12.00	1	500	20.00
Linn	2	900	58.50			
Logan	195	19,500	975.00	18	7,200	180.00
Lyon	12	6,000	390.00	21	10,500	446.25
Marion	368	147,200	10,304.00	407	244,200	9,157.50
Marshall	2	800	52.00	3	1,500	60.00
McPherson	1,232	554,400	38,808.00	1,551	849,948	33,997.92
Meade	604	232,540	13,952.40	1,243	497,200	14,916.00
Miami	16	7,200	468.00	5	3,000	135.00
Mitchell				50	25,000	1,000.00
Montgomery	52	20,800	1,352.00	55	22,000	880.00
Morris						
Morton	3,667	1,283,450	77,007.00	3,992	1,397,200	34,930.00
Nemaha	10	4,500	292.50			
Neosho	95	47,500	3,325.00	185	83,250	3,330.00
Ness	230	23,000	1,380.00	120	48,000	1,440.00
Norton						
Osage	1	500	32.50			
Osborne				25	12,500	437.50
Ottawa	153	45,900	2,983.50	43	21,500	860.00
Pawnee						

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BROOM CORN—CONCLUDED.

COUNTIES.	1911.			1912.		
	Acres.	Pounds.	Value.	Acres.	Pounds.	Value.
Phillips	10	2,000	$120.00	10	4,500	$157.50
Pottawatomie	22	11,000	715.00	11	6,600	264.00
Pratt	20	8,000	560.00	....	....	....
Rawlins	162	32,400	1,620.00	250	106,250	2,656.25
Reno	2,858	1,143,200	80,024.00	3,909	2,736,300	116,292.75
Republic	18	7,200	468.00	4	1,800	72.00
Rice	2,220	888,000	62,160.00	3,395	1,527,750	68,748.75
Riley	1	500	32.50	36	19,800	792.00
Rooks	1	200	11.00	....	....	....
Rush	....	....	....	675	303,750	9,112.50
Russell	....	....	....	5	2,500	87.50
Saline	....	....	....	....	....	....
Scott	562	112,400	6,182.00	278	111,200	2,780.00
Sedgwick	....	....	....	....	....	....
Seward	4,583	1,695,710	101,742.60	9,061	3,171,350	95,140.50
Shawnee	....	....	....	....	....	....
Sheridan	....	....	....	....	....	....
Sherman	30	4,500	225.00	....	....	....
Smith	....	....	....	....	....	....
Stafford	130	52,000	3,640.00	620	310,000	11,625.00
Stanton	4,085	510,625	25,531.25	3,909	1,368,150	34,203.75
Stevens	11,074	3,875,900	232,554.00	14,811	5,183,850	142,555.87
Sumner	80	40,000	2,800.00	380	177,460	6,211.10
Thomas	180	18,000	990.00	....	....	....
Trego	....	....	....	70	28,000	700.00
Wabaunsee	....	....	....	2	1,100	44.00
Wallace	1,140	114,000	6,270.00	1,036	466,200	11,655.00
Washington	30	13,500	877.50	5	2,250	90.00
Wichita	400	60,000	3,300.00	360	144,000	3,600.00
Wilson	30	13,500	877.50	59	29,500	1,180.00
Woodson	29	14,500	942.50	24	12,000	480.00
Wyandotte	....	....	....	....	....	....

MILLET AND HUNGARIAN.

TABLE showing the number of acres, product and value for the years 1911 and 1912.

COUNTIES.	1911.			1912.		
	Acres.	Tons.	Value.	Acres.	Tons.	Value.
The State	170,651	242,095	$1,668,445.00	162,888	308,539	$1,562,474.75
Allen	728	1,092	$6,552.00	826	1,445	$7,225.00
Anderson	305	610	3,660.00	410	820	4,100.00
Atchison	521	1,042	7,294.00	822	1,644	9,453.00
Barber	424	848	5,088.00	637	1,911	9,555.00
Barton	205	308	2,310.00	130	325	1,625.00
Bourbon	849	1,698	10,188.00	1,393	2,786	13,930.00
Brown	66	132	924.00	195	390	2,340.00
Butler	3,524	7,048	42,288.00	2,205	4,410	23,152.50
Chase	1,085	2,170	13,020.00	633	1,266	6,330.00
Chautauqua	511	767	4,602.00	339	508	2,794.00
Cherokee	877	1,316	7,896.00	1,242	1,242	7,452.00
Cheyenne	2,293	2,293	18,344.00	1,974	3,948	17,766.00
Clark	296	444	2,664.00	258	387	2,128.50
Clay	2,638	3,957	23,742.00	1,668	3,336	18,348.00
Cloud	614	1,228	7,368.00	558	976	4,880.00
Coffee	472	944	5,664.00	489	1,222	6,415.50
Comanche	195	293	1,758.00	122	244	1,342.00
Cowley	1,739	2,609	15,654.00	1,394	2,439	12,804.75
Crawford	663	663	3,978.00	892	1,338	7,359.00
Decatur	2,172	2,172	17,376.00	2,561	5,122	25,610.00
Dickinson	1,724	2,586	18,102.00	1,174	2,348	11,740.00
Doniphan	24	48	336.00	69	138	828.00
Douglas	393	786	5,109.00	351	702	3,861.00
Edwards	263	263	1,710.00	166	332	1,660.00
Elk	283	566	3,396.00	341	511	2,810.50
Ellis	2,055	2,055	16,440.00	1,370	2,740	13,700.00
Ellsworth	251	251	2,008.00	179	358	1,790.00
Finney	2,204	2,204	15,428.00	1,348	2,696	13,480.00
Ford	1,175	1,763	10,578.00	1,330	2,327	11,635.00

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MILLET AND HUNGARIAN—CONCLUDED.

COUNTIES.	1911.			1912.		
	Acres.	Tons.	Value.	Acres.	Tons.	Value.
Franklin	436	654	$4,578.00	752	1,504	$7,520.00
Geary	1,170	1,755	11,408.00	1,108	1,385	7,617.50
Gove	3,358	1,679	13,432.00	2,760	6,900	34,500.00
Graham	2,801	2,801	19,607.00	3,514	5,271	28,990.50
Grant	135	68	544.00	184	322	1,610.00
Gray	1,235	1,235	8,028.00	577	865	4,325.00
Greeley	606	303	2,424.00	513	1,026	5,643 00
Greenwood	516	1,032	6,192.00	457	914	5,027.00
Hamilton	287	144	1,152.00	225	393	1,965.00
Harper	705	1,410	8,460.00	757	1,514	7,570.00
Harvey	678	1,356	8,814.00	373	746	3,730.00
Haskell	316	316	2,528.00	187	327	1,635.00
Hodgeman	2,050	2,050	14,350.00	1,549	3,098	15,490.00
Jackson	4,596	9,192	59,748.00	5,312	10,624	53,120.00
Jefferson	1,367	2,734	17,771.00	1,780	4,005	20,025.00
Jewell	6,403	6,403	44,821.00	6,278	12,556	62,780.00
Johnson	81	122	854.00	250	625	3,125.00
Kearny	1,048	1,048	8,384.00	429	643	3,215.00
Kingman	942	1,413	9,891.00	838	1,466	7,696.50
Kiowa	113	226	1,582.00	34	68	374.00
Labette	522	783	5,481.00	1,023	1,278	6,390.00
Lane	2,503	1,877	15,016.00	2,126	3,720	19,530.00
Leavenworth	898	1,347	9,429.00	1,125	2,250	11,250.00
Lincoln	139	209	1,463.00	99	173	865.00
Linn	477	716	5,012.00	573	1,002	5,010.00
Logan	2,488	2,488	19,904.00	2,227	3,340	16,700.00
Lyon	2,734	5,468	38,276.00	1,826	3,652	20,086.00
Marion	3,159	6,318	41,067.00	2,927	5,854	29,270.00
Marshall	12,877	19,316	135,212.00	15,687	31,374	172,557.00
McPherson	2,866	4,299	30,093.00	1,794	4,036	22,198.00
Meade	1,092	1,638	11,466.00	1,352	2,366	11,830 00
Miami	303	606	4,242.00	618	927	5,098.50
Mitchell	759	759	5,313.00	527	1,054	5,270.00
Montgomery	1,017	2,034	14,238.00	657	1,149	6,606.75
Morris	6,905	10,358	62,148.00	5,600	11,200	56,000.00
Morton	24	24	168.00	33	49	245 00
Nemaha	11,289	16,934	118,538.00	14,443	21,664	129,984.00
Neosho	600	900	6,300.00	750	1,125	6,750.00
Ness	3,218	3,218	25,744.00	2,557	5,753	30,203.25
Norton	2,328	3,492	24,444.00	2,455	5,523	27,615.00
Osage	1,716	2,574	16,731.00	960	1,440	7,920.00
Osborne	735	1,103	7,721.00	576	1,296	6,480.00
Ottawa	480	480	3,360.00	207	414	2,070.00
Pawnee	360	540	3,780.00	177	442	2,431.00
Phillips	1,943	2,915	20,405.00	2,421	4,842	24,210.00
Pottawatomie	7,110	14,220	99,540.00	6,185	12,370	68,035.00
Pratt	259	518	3,367.00	326	652	3,260.00
Rawlins	1,375	1,375	11,000.00	1,427	2,854	14,270.00
Reno	650	975	6,825.00	1,071	2,945	14,725.00
Republic	1,407	2,111	14,777.00	1,787	3,574	19,657.00
Rice	642	963	6,741.00	739	1,478	8,129.00
Riley	3,070	6,140	39,910.00	2,105	3,157	15,785.00
Rooks	1,166	1,749	12,243.00	931	2,094	10,470.00
Rush	1,280	1,280	8,960.00	749	1,498	7,490.00
Russell	165	83	664.00	186	418	2,194.50
Saline	368	736	5,152.00	243	364	1,820.00
Scott	3,466	1,733	13,864.00	2,355	3,532	17,660.00
Sedgwick	945	1,890	11,340.00	934	1,868	9,340.00
Seward	392	392	2,744.00	503	754	3,770.00
Shawnee	1,370	2,740	19,180.00	1,592	3,184	19,104.00
Sheridan	2,171	1,628	13,024.00	2,155	2,693	13,465.00
Sherman	2,142	2,142	17,136.00	2,401	6,002	30,010.00
Smith	3,996	5,994	41,958.00	4,852	9,704	48,520.00
Stafford	87	174	1,218.00	128	256	1,280.00
Stanton	20	10	80.00	....	....	....
Stevens	25	25	175.00	40	60	300.00
Sumner	582	1,164	7,566.00	445	890	4,450.00
Thomas	1,296	1,296	11,016.00	981	1,716	8,580.00
Trego	5,107	5,107	40,856.00	2,847	7,117	35,585.00
Wabaunsee	4,449	6,674	46,718.00	3,546	8,865	42,108.75
Wallace	1,613	1,210	9,680.00	1,712	2,996	14,980.00
Washington	4,838	9,676	67,732.00	4,898	6,122	36,732.00
Wichita	1,305	653	5,224.00	797	1,394	6,970.00
Wilson	236	354	2,301.00	546	819	4,914.00
Woodson	272	544	3,536.00	706	1,059	5,559.75
Wyandotte	23	46	322.00	8	18	108.00

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SUGAR BEETS.

TABLE showing the number of acres, product and value for the years 1911 and 1912.

COUNTIES.	1911.			1912.		
	Acres.	Tons.	Value.	Acres.	Tons.	Value.
The State	4.963	27.256	$136.280.00	8.903	88.842	$484,285.00
Allen	1	6	$30 00			
Anderson	1	5	25.00	3	24	$120.00
Atchison						
Barber						
Barton	1	4	20.00	2	20	100.00
Bourbon						
Brown	19	95	475.00			
Butler						
Chase	1	5	25.00			
Chautauqua						
Cherokee				1	8	40.00
Cheyenne						
Clark						
Clay						
Cloud						
Coffey				6	54	270.00
Comanche						
Cowley						
Crawford						
Decatur						
Dickinson	1	4	20.00			
Doniphan						
Douglas				2	20	100.00
Edwards						
Elk						
Ellis						
Ellsworth						
Finney	*3,768	20,724	103,620.00	5,744	57,440	315,920.00
Ford						
Franklin				20	160	800.00
Geary				2	22	110.00
Gove						
Graham						
Grant	1					
Gray						
Greeley						
Greenwood						
Hamilton	15	75	375.00	25	250	1,250.00
Harper						
Harvey						
Haskell						
Hodgeman						
Jackson						
Jefferson						
Jewell						
Johnson						
Kearny	†1,142	6,281	31.405.00	2,271	22,710	124,905.00
Kingman						
Kiowa						
Labette				1	8	40.00
Lane						
Leavenworth						
Lincoln				1	9	45.00
Linn						
Logan						
Lyon				515	5,150	25,750.00
Marion						
Marshall						
McPherson						
Meade						
Miami						
Mitchell						
Montgomery	1	6	30.00	3	24	120.00
Morris						
Morton						
Nemaha						
Neosho						
Ness						
Norton	1			4	36	180 00
Osage				45	450	2,250.00
Osborne						
Ottawa						
Pawnee						

SUGAR BEETS—CONCLUDED.

COUNTIES.	1911.			1912.		
	Acres.	Tons.	Value.	Acres.	Tons.	Value.
Phillips						
Pottawatomie						
Pratt						
Rawlins						
Reno				175	1,750	$8,750.00
Republic						
Rice						
Riley						
Rooks				1	8	40.00
Rush						
Russell				1	9	45.00
Saline						
Scott						
Sedgwick	7	35	$175.00	15	150	750.00
Seward				3	21	105.00
Shawnee						
Sheridan						
Sherman						
Smith						
Stafford				53	424	2,120.00
Stanton						
Stevens						
Sumner	4	16	80.00			
Thomas						
Trego						
Wabaunsee				8	80	400.00
Wallace				1	5	25.00
Washington						
Wichita						
Wilson						
Woodson						
Wyandotte				1	10	50.00

* Acres planted, 6276. † Acres planted, 3308.

SORGHUM, 1911.

TABLE showing the number of acres, product and value for the year 1911.

COUNTIES.	Acres planted for syrup or sugar.	Gallons.	Value.	Acres planted for forage or grain.	Value.
The State	13,655	896.494	$435,844.62	728,128	$4,991,097.00
Allen	116	8,120	$3,897.60	1,011	$8,088.00
Anderson	281	16,298	8,149.00	1,107	9,963.00
Atchison	103	10,300	5,150.00	242	3,146.00
Barber	43	2,580	1,290.00	7,328	58,624.00
Barton	68	4,430	2,210.00	2,760	24,840.00
Bourbon	1,159	96,197	47,136.53	1,557	15,570.00
Brown	55	5,225	2,612.50	30	330.00
Butler	523	31,380	15,690.00	11,557	104,013.00
Chase	7	525	262.50	3,016	24,128.00
Chautauqua	196	13,720	6,860.00	9,480	75,840.00
Cherokee	152	12,160	6,080.00	1,965	21,615.00
Cheyenne	748	18,700	9,350.00	9,656	48,280.00
Clark	15	900	450.00	9,940	79,520.00
Clay	63	4,725	2,362.50	1,149	9,192.00
Cloud	86	6,020	3,010.00	3,095	24,760.00
Coffey	129	10,320	4,850.40	1,170	9,360.00
Comanche	42	2,730	1,365.00	5,960	41,720.00
Cowley	340	25,500	12,750.00	10,568	84,544.00
Crawford	509	41,229	18,965.34	752	6,768.00
Decatur	18	360	198.00	30,841	154,205.00
Dickinson	150	10,500	5.250.00	3,171	31,710.00
Doniphan	8	640	320.00	.37	407.00
Douglas	38	2,850	1,282.50	1,231	18,465.00
Edwards	20	1,300	650.00	5,376	37,632.00
Elk	286	17,160	7,722.00	3,763	33,867.00
Ellis				4,644	23,220.00
Ellsworth	2	120	60.00	7,767	62,136.00
Finney	15	600	300.00	14,956	134.604.00
Ford	10	600	300.00	15,184	121,472.00

SORGHUM, 1911—CONCLUDED.

COUNTIES.	Acres planted for syrup or sugar.	Gallons.	Value.	Acres planted for forage or grain.	Value.
Franklin	111	5,550	$2,608.50	984	$11,808.00
Geary	25	2,000	1,000.00	1,104	9,936.00
Gove	20	400	200.00	35,514	177,570.00
Graham	238	4,760	2,380.00	12,171	85,197.00
Grant	3	90	45.00	5,578	27,890.00
Gray	30	1,500	750.00	11,979	95,832.00
Greeley	20	400	200.00	5,562	33,372.00
Greenwood	160	12,000	5,760.00	12,728	101,824.00
Hamilton	....	....	....	5,432	43,456.00
Harper	60	3,300	1,650.00	1,480	11,840.00
Harvey	117	7,605	3,802.50	1,705	11,935.00
Haskell	495	14,850	7,425.00	4,317	30,219.00
Hodgeman	195	3,900	1,950.00	21,700	108,500.00
Jackson	39	3,549	1,774.50	599	7,188.00
Jefferson	787	68,469	32,865.12	721	8,652.00
Jewell	138	8,280	4,140.00	3,993	43,923.00
Johnson	30	2,100	1,050.00	128	2,304.00
Kearny	129	5,160	2,580.00	7,435	59,480.00
Kingman	32	1,600	800.00	7,101	49,707.00
Kiowa	....	....	....	3,575	25,025.00
Labette	496	38,688	19,344.00	1,674	16,740.00
Lane	....	....	....	23,856	143,136.00
Leavenworth	1,049	83,920	37,764.00	640	9,600.00
Lincoln	1	50	25.00	5,868	41,076.00
Linn	180	9,900	4,950.00	667	6,003.00
Logan	30	600	300.00	44,655	223,275.00
Lyon	761	57,075	28,537.50	3,926	35,334.00
Marion	86	6,880	3,440.00	6,673	53,384.00
Marshall	24	2,040	1,020.00	1,109	13,308.00
McPherson	112	7,280	3,640.00	4,010	36,090.00
Meade	66	3,960	1,980.00	11,500	92,000.00
Miami	69	4,140	2,070.00	553	6,636.00
Mitchell	175	8,750	4,375.00	3,788	26,516.00
Montgomery	151	12,231	5,993.19	2,277	22,770.00
Morris	42	2,940	1,470.00	4,904	44,136.00
Morton	20	1,000	500.00	3,711	22,266.00
Nemaha	101	10,100	5,050.00	807	10,491.00
Neosho	116	10,092	4,541.40	1,383	12,447.00
Ness	11	220	110.00	23,800	142,800.00
Norton	204	4,080	2,040.00	24,257	194,056.00
Osage	334	25,050	12,024.00	3,138	25,104.00
Osborne	33	1,320	660.00	11,673	58,365.00
Ottawa	55	3,300	1,650.00	4,065	32,520.00
Pawnee	....	....	....	5,385	43,080.00
Phillips	63	1,890	945.00	7,618	68,562.00
Pottawatomie	68	6,396	3,134.04	576	6,912.00
Pratt	33	1,980	990.00	4,671	32,697.00
Rawlins	31	775	387.50	20,449	143,143.00
Reno	56	3,360	1,680.00	6,798	54,384.00
Republic	54	3,510	1,755.00	2,471	19,768.00
Rice	....	....	....	3,850	34,650.00
Riley	50	4,000	2,000.00	1,988	19,880.00
Rooks	....	....	....	6,860	48,020.00
Rush	7	210	105.00	9,527	66,689.00
Russell	....	....	....	7,623	38,115.00
Saline	78	5,070	2,433.60	5,800	52,200.00
Scott	10	200	100.00	27,266	163,596.00
Sedgwick	90	5,400	2,700.00	2,432	21,888.00
Seward	40	2,000	1,000.00	9,442	66,094.00
Shawnee	187	18,700	9,350.00	1,303	19,545.00
Sheridan	....	....	....	18,116	90,580.00
Sherman	10	200	100.00	10,602	53,010.00
Smith	213	8,520	4,260.00	2,517	22,653.00
Stafford	31	2,325	1,162.50	3,863	34,767.00
Stanton	30	....	....	4,801	24,005.00
Stevens	20	1,100	550.00	7,872	39,360.00
Sumner	74	4,440	2,220.00	2,404	16,828.00
Thomas	....	....	....	18,461	92,305.00
Trego	42	1,050	525.00	9,854	59,124.00
Wabaunsee	50	5,000	2,500.00	3,161	37,932.00
Wallace	12	240	120.00	5,496	27,480.00
Washington	72	5,400	2,700.00	1,831	18,310.00
Wichita	....	....	....	8,605	51,630.00
Wilson	193	15,440	6,948.00	2,298	20,682.00
Woodson	214	14,980	7,190.40	2,119	21,190.00
Wyandotte	....	....	....	16	288.00

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SORGHUM, 1912.

TABLE showing the number of acres, product and value for the year 1912.

COUNTIES.	Acres planted for syrup or sugar.	Gallons.	Value.	Acres planted for forage or grain.	Value.
The State	17,813	1,320,513	$632,480.34	718,044	$7,049,986.00
Allen	684	60,192	$27,086.40	2,917	$29,170.00
Anderson	297	22,275	11,137.50	2,825	28,250.00
Atchison	34	3,400	1,700.00	689	9,646.00
Barber	7	490	245.00	4,944	49,440.00
Barton	27	1,890	945.00	5,078	55,803.00
Bourbon	2,157	161,765	77,652.00	3,158	31,580.00
Brown	62	5,580	2,790.00	322	4,830.00
Butler	1,232	86,240	41,395.20	13,095	144,045.00
Chase	141	10,575	4,970.25	3,528	35,280.00
Chautauqua	447	31,290	15,645.00	11,474	97,529.00
Cherokee	217	10,850	5,099.50	2,438	23,161.00
Cheyenne	223	15,610	7,180.60	9,064	72,512.00
Clark	....	....	....	9,568	105,193.00
Clay	21	1,365	655.20	3,451	41,412.00
Cloud	128	7,680	3,840.00	4,896	48,960.00
Coffey	67	5,360	2,680.00	3,402	34,020.00
Comanche	....	....	....	3,685	36,850.00
Cowley	550	41,250	20,625.00	12,855	128,550 00
Crawford	179	8,950	4,475.00	2,430	21,870.00
Decatur	137	8,220	3,863.40	17,138	187,104.00
Dickinson	1	70	33.60	4,491	49,401 00
Doniphan	81	4,185	2,092.50	45	675.00
Douglas	61	4,270	1,921.50	1,652	24,780.00
Edwards	....	....	....	3,580	39,880.00
Elk	337	23,590	11,795.00	5,291	44,973.50
Ellis	35	2,450	1,200.50	12,227	122,270.00
Ellsworth	269	18,830	9,415.00	8,327	83,270.00
Finney	45	3,150	1,512.00	13,423	127,518.50
Ford	203	15,225	7,308.00	8,988	89,880.00
Franklin	151	11,325	5,096.25	1,606	19,272.00
Geary	39	2,925	1,374.75	1,659	23,226.00
Gove	....	....	....	37,571	338,139.00
Graham	....	....	....	6,739	64,020.50
Grant	....	....	....	4,994	44,946.00
Gray	40	2,800	1,344.00	8,070	76,665.00
Greeley	10	500	250.00	5,364	42,912.00
Greenwood	170	11,900	5,712.00	16,904	169,040.00
Hamilton	....	....	....	4,371	39,339.00
Harper	152	10,640	5,320.00	1,578	14,102.00
Harvey	52	3,900	1,872.00	2,502	27,522.00
Haskell	....	....	....	3,277	32,770.00
Hodgeman	365	25,550	12,775.00	13,909	139,090.00
Jackson	33	2,409	1,204.50	1,203	18,045.00
Jefferson	1,019	94,767	42,645.15	1,313	19,695.00
Jewell	171	11,115	5,557.50	6,261	87,654.00
Johnson	77	5,775	2,772.00	536	8,040.00
Kearny	57	3,705	1,852.50	5,080	45,720.00
Kingman	57	3,990	1,995.00	4,129	41,290.00
Kiowa	108	7,560	3,780.00	6,873	70,103.00
Labette	202	10,100	5,050.00	3,289	29,601.00
Lane	10	600	300.00	14,478	115,824.00
Leavenworth	875	65,625	29,531.25	936	14,040.00
Lincoln	4	260	122.20	5,519	60,709 00
Linn	296	24,568	12,284.00	1,487	14,870.00
Logan	2	110	55.00	32,497	292,473.00
Lyon	496	42,160	18,972.00	7,399	81,389.00
Marion	140	10,500	4,725.00	9,076	90,760.00
Marshall	73	4,380	2,190.00	2,141	23,551.00
McPherson	173	13,840	6,920.00	5,588	61,468.00
Meade	799	59,925	29,962.50	9,643	106,073.00
Miami	94	7,520	3,760.00	1,022	13,286.00
Mitchell	199	12,935	6,467.50	4,135	45,485.00
Montgomery	186	12,090	5,803.20	4,329	43,290.00
Morris	67	5,025	2,512.50	9,147	100,617.00
Morton	15	750	375.00	3,696	33,264.00
Nemaha	150	9,750	4,387.50	1,597	15,970.00
Neosho	189	13,797	6,434.59	2,334	23,340.00
Ness	....	....	....	18,456	134,560.00
Norton	635	44,450	21,336.00	14,008	133,076.00
Osage	193	14,475	7,237.50	5,248	57,728.00
Osborne	108	7,560	3,780.00	10,350	124,200.00
Ottawa	8	560	268.80	5,914	59,140.00
Pawnee	5	350	175.00	4,836	53,196.00

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SORGHUM, 1912—CONCLUDED.

COUNTIES.	Acres planted for syrup or sugar.	Gallons.	Value.	Acres planted for forage or grain.	Value.
Phillips	40	3,200	$1,600.00	8,955	$98,505.00
Pottawatomie	159	14,310	7,155.00	1,920	28,800.00
Pratt	20	1,400	700.00	2,877	31,647.00
Rawlins	93	6,045	3,022.50	10,979	109,790.00
Reno	133	9,975	4,788.00	8,277	91,047.00
Republic	92	5,520	2,760.00	3,992	43,912.00
Rice	281	21,075	10,116.00	4,571	54,852.00
Riley	29	2,175	1,087.50	2,525	35,350.00
Rooks	10	750	375.00	5,433	54,330.00
Rush	17	1,190	595.00	9,369	103,059.00
Russell	....	....	....	6,621	72,831.00
Saline	76	5,320	2,553.60	6,786	67,860.00
Scott	20	1,100	550.00	24,872	198,976.00
Sedgwick	63	4,725	2,268.00	3,245	35,695.00
Seward	58	3,480	1,740.00	9,644	96,440.00
Shawnee	274	21,920	10,302.40	2,524	32,812.00
Sheridan	1	55	27.50	14,119	112,952.00
Sherman	10	650	325.00	8,608	68,864.00
Smith	84	5,880	2,940.00	4,343	60,802.00
Stafford	190	13,300	6,650.00	6,725	73,975.00
Stanton	....	....	....	3,938	35,442.00
Stevens	6	300	150.00	7,635	68,715.00
Sumner	173	13,840	6,228.00	5,413	54,130.00
Thomas	40	2,400	1,200.00	20,169	171,436.50
Trego	50	3,250	1,625.00	13,296	119,664.00
Wabaunsee	98	9,310	4,189.50	5,466	76,524.00
Wallace	10	600	300.00	5,511	44,088.00
Washington	83	4,980	2,490.00	3,374	40,488.00
Wichita	47	2,585	1,292.00	8,402	67,216.00
Wilson	219	16,425	8,212.50	4,513	45,130.00
Woodson	420	29,400	13,524.00	3,362	36,982.00
Wyandotte	5	400	200.00	46	828.00

MILO MAIZE.

TABLE showing the number of acres, product and value for the years 1911 and 1912.

COUNTIES.	1911.			1912.		
	Acres.	Tons.	Value.	Acres.	Tons.	Value.
The State	174,404	254,599	$1,808,855.00	183,611	440,573	$2,300,402.50
Allen	45	158	$869.00	101	303	$1,515.00
Anderson	144	432	2,592.00	58	174	783.00
Atchison	7	25	138.00	17	51	255.00
Barber	669	2,007	12,042.00	444	1,332	6,660.00
Barton	256	512	3,328.00	825	2,475	12,375.00
Bourbon	22	77	462.00	83	207	1,035.00
Brown	....	....	....	5	15	82.50
Butler	462	1,155	8,353.00	532	1,596	7,182.00
Chase	....	....	....	602	1,505	6,772.50
Chautauqua	64	224	1,344.00	161	322	1,771.00
Cherokee	97	291	1,601.00	187	374	2,057.00
Cheyenne	27	27	216.00	863	1,726	9,493.00
Clark	1,645	4,113	24,678.00	2,048	4,096	22,528.00
Clay	21	63	378.00	116	348	1,914.00
Cloud	13	33	198.00	77	192	1,056.00
Coffey	44	132	726.00	21	52	260.00
Comanche	131	393	2,358.00	898	2,245	11,225.00
Cowley	149	447	2,682.00	181	452	2,260.00
Crawford	8	24	144.00	429	858	4,719.00
Decatur	4,074	6,111	48,888.00	5,873	11,746	58,730.00
Dickinson	83	166	966.00	419	1,047	5,758.50
Doniphan	....	....	....	3	9	49.50
Douglas	29	116	638.00	36	126	630.00
Edwards	40	80	480.00	351	877	4,385.00
Elk	160	320	1,920.00	66	132	726.00
Ellis	35	35	263.00	90	225	1,237.50
Ellsworth	....	....	....	14	35	175.00
Finney	7,719	15,438	108,066.00	7,456	18,640	93,200.00
Ford	656	1,312	7,872.00	1,868	4,670	25,685.00

MILO MAIZE—CONCLUDED.

COUNTIES.	1911.			1912.		
	Acres.	Tons.	Value.	Acres.	Tons.	Value.
Franklin	48	144	$792.00	76	228	$1,140.00
Geary	4	12	66.00	49	147	808.50
Gove	4,791	4,791	38,328.00	6,814	17,035	93,692.50
Graham	934	1,401	10,508.00	1,703	5,109	25,545.00
Grant	6,734	6,734	53,872.00	5,658	11,316	56,580.00
Gray	7,010	10,515	63,090.00	5,261	15,783	78,915.00
Greeley	1,652	1,652	13,216.00	1,814	3,628	18,140.00
Greenwood	9	27	162.00	177	531	2,655.00
Hamilton	9,011	9,011	72,088.00	5,842	11,684	58,420.00
Harper	84	252	1,764.00	231	577	2,885.00
Harvey	8	24	144.00	444	1,110	5,550.00
Haskell	3,108	4,662	32,634.00	3,084	7,710	42,405.00
Hodgeman	4,247	5,309	42,472.00	1,653	3,306	18,183.00
Jackson	33	116	696.00	57	199	1,094.50
Jefferson	42	147	882.00	125	437	2,185.00
Jewell	17	26	195.00	190	665	3,325.00
Johnson	60	180	1,080.00	156	546	3,008.00
Kearny	7,875	11,813	94,504.00	5,801	14,502	72,510.00
Kingman	102	306	1,989.00	674	2,022	11,121.00
Kiowa	1,252	3,130	18,780.00	308	770	4,235.00
Labette	147	441	2,646.00	910	1,820	9,100 00
Lane	7,629	5,722	45,776.00	4,494	8,988	49,434.00
Leavenworth	9	27	162.00	32	96	528.00
Lincoln	244	488	3,172.00	8	28	116.00
Linn	60	120	660.00	73	219	985.50
Logan	4,346	2,173	17,384.00	4,222	8,444	46,442.00
Lyon	34	102	612.00	553	1,659	8,295.00
Marion	13	39	254.00	79	197	886.50
Marshall	5	10	70.00	6	18	90.00
McPherson	17	43	301.00	21	63	283.50
Meade	11,057	27,643	165,858.00	8,347	16,694	100,164.00
Miami	22	55	358.00	32	112	560.00
Mitchell	....	....	....	63	220	990.00
Montgomery	65	195	1,268.00	141	211	1,266.00
Morris	43	129	774.00	25	62	310.00
Morton	8,545	12,818	102,544.00	8,864	26,592	132,960.00
Nemaha	7	21	126.00	13	32	160.00
Neosho	21	74	444.00	159	397	1,985.00
Ness	3,501	3,501	28,008.00	5,770	11,540	57,700.00
Norton	7,780	11,670	81,690.00	4,896	12,240	61,200.00
Osage	32	64	384.00	48	144	648.00
Osborne	24	36	252.00	130	390	1,950.00
Ottawa	21	63	347.00	4	10	50.00
Pawnee	88	264	1,848.00	1,477	4,431	22,155.00
Phillips	221	442	3,094.00	1,133	3,399	16,995.00
Pottawatomie	4	12	78.00	69	207	1,138.50
Pratt	626	1,252	8,764.00	742	2,226	12,243.00
Rawlins	278	278	2,224.00	2,616	5,232	26,160.00
Reno	56	112	728.00	748	1,870	9,350.00
Republic	12	18	126.00	32	80	440.00
Rice	11	22	165.00	235	705	3,525.00
Riley	38	76	456.00	34	119	595 00
Rooks	42	84	588.00	296	888	3,996 00
Rush	40	60	420.00	1,210	3,025	16,637.50
Russell	2,715	4,073	28,511.00	246	615	3,075 00
Saline	5	13	91.00	26	65	325.00
Scott	7,506	11,259	90,072.00	4,707	9,414	47,070.00
Sedgwick	54	162	1,215.00	510	1,275	6,375.00
Seward	19,207	28,811	187,272.00	14,125	35,312	194,216.00
Shawnee	93	279	1,814.00	63	157	863.50
Sheridan	45	23	184.00	1,934	3,868	19,340.00
Sherman	287	144	1,152.00	1,011	2,527	12,635.00
Smith	2	4	28.00	90	315	1,575.00
Stafford	40	80	520.00	5,115	15,345	76,725.00
Stanton	5,406	4,055	32,440.00	4,362	13,086	65,430.00
Stevens	15,914	31,828	222,796.00	14,194	28,388	156,134.00
Sumner	451	1,353	9,471.00	352	880	4,400.00
Thomas	6,863	3,432	27,456.00	4,843	12,107	60,535.00
Trego	1,257	943	7,544.00	13,459	33,647	185,058.50
Wabaunsee	62	124	744.00	40	120	600.00
Wallace	2,431	2,431	19,448.00	3,180	7,950	39,750.00
Washington	49	98	548.00	240	600	3,000.00
Wichita	3,267	3,267	26,136.00	3,328	8,320	41,600.00
Wilson	10	20	130.00	44	132	660.00
Woodson	81	203	1,218.00	319	957	4,785.00
Wyandotte	....	....	....	....	....	....

KAFIR CORN.

Table showing the number of acres, product and value for the years 1911 and 1912.

Counties.	1911.			1912.		
	Acres.	Tons.	Value.	Acres.	Tons.	Value.
The State	919,046	2,561,415	$14,455,037.00	1,422,114	4,377,828	$19,635,557.50
Allen	13,160	52,640	$263,200.00	25,654	89,789	$404,050.50
Anderson	6,953	27,812	139,060.00	15,964	55,874	223,496.00
Atchison	239	956	4,780.00	492	1,722	8,610.00
Barber	21,071	73,749	368,745.00	28,369	99,291	446,809.50
Barton	6,813	13,626	81,756.00	10,626	37,191	167,359.50
Bourbon	5,171	25,855	129,275.00	12,295	36,885	165,982.50
Brown	175	700	3,850.00	514	2,556	10,280.00
Butler	77,908	233,724	1,168,620.00	119,304	417,564	1,670,256.00
Chase	10,400	41,600	208,000.00	14,141	42,423	169,692.00
Chautauqua	17,624	88,120	484,660.00	28,465	56,930	284,650.00
Cherokee	2,012	6,036	30,180.00	3,193	7,982	39,910.00
Cheyenne	654	654	5,232.00	2,247	4,494	22,470.00
Clark	15,974	47,922	239,610.00	13,318	39,954	199,770.00
Clay	3,627	9,068	45,340.00	5,048	17,668	88,340.00
Cloud	2,039	6,117	30,585.00	2,830	8,490	38,205.00
Coffey	9,353	32,736	163,680.00	21,239	63,717	286,726.50
Comanche	12,778	38,334	191,670.00	13,642	40,926	184,167.00
Cowley	30,715	122,860	675,730.00	64.498	193,494	870,723.00
Crawford	3,031	12,124	60,620.00	7,021	17,552	87,760.00
Decatur	18,620	27,930	223,440.00	16,208	40,520	182,340.00
Dickinson	5,204	15,612	93,672.00	7,969	23,904	119,535.00
Doniphan	24	96	528.00	66	264	1,320.00
Douglas	1,278	5,112	28,116.00	4,513	18,052	81,234.00
Edwards	6,643	15,500	77,500.00	9,263	27,789	138,945.00
Elk	15,711	47,133	259,232.00	28,263	56,526	282,630.00
Ellis	10,956	10,956	76,692.00	21,574	64,722	323,610.00
Ellsworth	8,169	16,338	114,366.00	9,968	29,904	149,520.00
Finney	5,574	13,006	84,539.00	7,444	18,610	83,745.00
Ford	17,639	47,037	235,185.00	18,428	55,284	276,420.00
Franklin	4,772	16,702	83,510.00	11,882	47,528	190,112.00
Geary	2,890	11,560	57,800 00	4,193	14,675	73,375.00
Gove	10,110	10,110	80,880.00	14,954	44,862	201,879.00
Graham	17,293	28,822	201,754.00	16,436	57,526	230,104 00
Grant	3,324	3,324	26,592.00	3,128	6,256	31,280.00
Gray	7,734	15,468	85,074.00	5,959	17,877	80,446.50
Greeley	1,232	616	4,928.00	1,172	2,930	13,185.00
Greenwood	20,350	61,050	305,250.00	42,223	126,699	633,495.00
Hamilton	2,748	2,748	21,984.00	1,571	3,927	17,671.50
Harper	12,137	42,480	254,880.00	29,159	87,477	349,908.00
Harvey	2,437	7,311	43.866.00	3,708	11,124	55,620.00
Haskell	2,893	3,616	25,312.00	2,166	6,498	32,490.00
Hodgeman	10,169	15,254	122,032.00	10,944	32,832	164,160.00
Jackson	789	3,156	15,780.00	3,738	14,952	74,760.00
Jefferson	923	3,692	18,460.00	3,051	12,204	54,918.00
Jewell	3.138	6,276	43.932 00	5,351	21,404	96,318.00
Johnson	242	726	3,993.00	612	2,448	12,240.00
Kearny	3,095	4,643	34,823.00	3,300	9,900	44,550.00
Kingman	14,777	44,331	265,986.00	25,195	75,585	377,925.00
Kiowa	16,488	49,464	247,320.00	12,858	38,574	192,870.00
Labette	8,909	35,636	195,998.00	20,842	41,684	208,420.00
Lane	5,184	7,776	62,208.00	4,204	8,408	42,040.00
Leavenworth	214	856	4,280.00	800	3,200	16,000.00
Lincoln	12,307	30,768	184,608.00	12,852	51,408	205,632.00
Linn	4,881	14.643	73,215.00	9,623	33,680	134,720 00
Logan	7,120	3,560	28,480.00	6,763	20,289	91,300 50
Lyon	22,166	88,664	443,320.00	37,047	129,664	518,656.00
Marion	13,246	52,984	317,904.00	22,884	68,652	274,608.00
Marshall	919	2.757	16.542.00	2,817	8,451	42,255.00
McPherson	6,586	19,758	118,548.00	15,362	53,767	215,068,00
Meade	17,992	53,976	269,880.00	18,865	56,595	282,975.00
Miami	963	2,889	17,334.00	5,355	21,420	96,390.00
Mitchell	5,506	16,518	99,108.00	4,849	19,396	77,584.00
Montgomery	10,091	35,319	211,914.00	22,847	45,694	228,470.00
Morris	10,058	40,232	201,160.00	17,055	51,165	204,660.00
Morton	2,168	3,252	26,016.00	2,641	5,282	26,410.00
Nemaha	881	3,524	19,382.00	2,424	6,060	30,300.00
Neosho	10,664	53,320	266,600.00	20,968	52,420	262,100.00
Ness	16,350	16,350	130,800.00	12,816	38,448	173,016.00
Norton	20,180	40,360	262,340.00	15,138	45,414	181,656.00
Osage	10,878	43,512	239,316.00	22,045	66,135	297,607.50
Osborne	10,407	20,814	124,884.00	12,418	49,672	198,688.00
Ottawa	4,724	18,860	94,480.00	7,667	26,834	107,336.00
Pawnee	11,121	33,363	200,178.00	21,769	76,191	342,859.50

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KAFIR CORN—CONCLUDED.

COUNTIES.	1911.			1912.		
	Acres.	Tons.	Value.	Acres.	Tons.	Value.
Phillips	5,712	17,136	$107,100.00	10,494	36,729	$165,280.50
Pottawatomie	3,132	12,528	75,168.00	6,901	27,604	138,020.00
Pratt	20,573	41,146	246,876.00	24,927	74,781	373,905.00
Rawlins	2,593	2,593	20,744.00	5,796	17,388	69,552.00
Reno	8,026	24,078	144,468.00	12,817	38,451	173,029.50
Republic	310	620	3,720.00	609	1,827	9,135.00
Rice	5,451	13,628	95,396.00	10,373	41,492	165,968.00
Riley	2,665	7,995	43,973.00	4,846	19,384	87,228.00
Rooks	10,789	26,973	161,838.00	12,792	44,772	179,088.00
Rush	9,648	19,296	115,776.00	14,156	42,468	212,340.00
Russell	13,243	13,243	92,701.00	14,496	43,488	195,696.00
Saline	5,709	19,982	119,892.00	8,950	26,850	120,825.00
Scott	4,041	4,041	32,328.00	3,802	7,604	38,020.00
Sedgwick	12,135	42,473	254,838.00	27,711	83,133	374,098.50
Seward	13,015	26,030	156,180.00	12,545	37,635	188,175.00
Shawnee	4,319	17,276	103,656.00	7,775	27,212	136,060.00
Sheridan	15,630	7,815	62,520.00	17,620	44,050	198,225.00
Sherman	1,007	1,007	8,056.00	1,538	3,845	17,302.50
Smith	2,092	5,230	31,380.00	4,872	19,488	87,696.00
Stafford	6,045	15,113	90,678.00	12,641	37,923	189,615.00
Stanton	1,173	880	7,040.00	1,189	3,567	14,268.00
Stevens	9,785	19,570	136,990.00	9,147	18,294	91,470.00
Sumner	18,710	74,840	486,460.00	61,599	184,797	831,586.50
Thomas	9,915	4,958	39,664.00	11,285	33,855	135,420.00
Trego	12,355	12,355	98,840.00	17,419	52,257	235,156.50
Wabaunsee	8,043	24,129	132,710.00	15,248	60,992	243,968.00
Wallace	1,796	1,796	14,368.00	2,817	7,042	31,689.00
Washington	2,206	6,618	33,090.00	4,866	12,165	60,825.00
Wichita	1,820	1,820	14,560.00	2,097	4,194	20,970.00
Wilson	14,331	42,993	214,965.00	28,293	84,879	381,955.50
Woodson	12,198	48,792	268,356.00	18,229	54,687	273,435.00
Wyandotte	8	32	192.00	47	188	940.00

JERUSALEM CORN.

TABLE showing the number of acres, product and value for the years 1911 and 1912.

COUNTIES.	1911.			1912.		
	Acres.	Tons.	Value.	Acres.	Tons.	Value.
The State	5,582	11,860	$73,399.00	3,494	9,965	$46,082.50
Allen	10	40	$200.00	....	....	....
Anderson	43	172	860.00	6	21	$84.00
Atchison	16	64	320.00	15	52	260.00
Barber	8	28	140 00	....	....	....
Barton	22	44	264.00	19	66	297.00
Bourbon	....	....	....	43	129	580.50
Brown	....	....	....	10	40	200.00
Butler	400	1,200	6,000.00	....	....	....
Chase	....	....	....	....	....	....
Chautauqua	159	795	4,373.00	....	....	....
Cherokee	....	....	....	4	10	50.00
Cheyenne	18	18	144.00	35	70	350.00
Clark	60	180	900.00	....	....	....
Clay	9	23	115.00	8	28	140.00
Cloud	78	234	1,170.00	9	27	121.50
Coffey	....	....	....	1	3	13.50
Comanche	50	150	750.00	....	....	....
Cowley	1	4	22.00	....	....	....
Crawford	471	1,884	9,420.00	509	1,272	6,360.00
Decatur	20	30	240.00	35	87	391.50
Dickinson	8	24	144.00	10	30	150 00
Doniphan	3	12	66.00	2	8	40.00
Douglas	36	144	792.00	....	....	....
Edwards	....	....	....	102	306	1,530.00
Elk	....	....	....	....	....	....
Ellis	48	48	336.00	30	90	450.00
Ellsworth	....	....	....	....	....	....
Finney	270	630	4,095.00	92	230	1,035.00
Ford	....	....	....	10	30	150.00

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JERUSALEM CORN—CONCLUDED.

COUNTIES.	1911.			1912.		
	Acres.	Tons.	Value.	Acres.	Tons.	Value.
Franklin	30	105	$525.00	5	20	$80.00
Geary	2	8	40.00	10	35	175.00
Gove	116	116	928.00	107	321	1,605.00
Graham	27	45	315.00	......	......	......
Grant	283	283	2,264.00	55	110	550.00
Gray	......	......	......	61	183	823.50
Greeley	75	38	304.00	21	52	234.00
Greenwood	......	......	......	2	6	30.00
Hamilton	366	366	2,928.00	132	330	1,485.00
Harper	......	......	......	58	174	696.00
Harvey	15	45	270.00	6	18	90.00
Haskell	35	44	308.00	......	......	......
Hodgeman	445	668	5,344.00	10	30	150.00
Jackson	38	152	760.00	......	......	......
Jefferson	......	......	......	35	140	630.00
Jewell	5	10	70.00	......	......	......
Johnson	5	15	83.00	......	......	......
Kearny	778	1,167	8,753.00	439	1,317	5,926.50
Kingman	......	......	......	......	......	......
Kiowa	10	30	150.00	......	......	......
Labette	21	84	462.00	9	18	90.00
Lane	100	150	1,200.00	5	10	50.00
Leavenworth	9	36	180.00	21	84	420.00
Lincoln	......	......	......	......	......	......
Linn	38	114	570.00	4	14	56.00
Logan	63	37	296.00	50	150	675.00
Lyon	......	......	......	......	......	......
Marion	......	......	......	133	399	1,596.00
Marshall	......	......	......	......	......	......
McPherson	......	......	......	......	......	......
Meade	93	279	1,395.00	20	60	300.00
Miami	6	18	108.00	11	44	198.00
Mitchell	......	......	......	......	......	......
Montgomery	33	116	696.00	5	10	50.00
Morris	......	......	......	......	......	......
Morton	111	167	1,336.00	77	154	770.00
Nemaha	5	20	110 00	34	85	425.00
Neosho	......	......	......	......	......	......
Ness	398	398	3,184.00	182	546	2,457.00
Norton	63	126	819.00	281	843	3,372.00
Osage	......	......	......	82	246	1,107.00
Osborne	1	2	12.00	5	20	80.00
Ottawa	13	52	260.00	......	......	......
Pawnee	13	39	234.00	10	35	157.50
Phillips	46	138	863.00	......	......	......
Pottawatomie	33	132	792.00	7	28	140.00
Pratt	......	......	......	......	......	......
Rawlins	15	15	120.00	16	48	192.00
Reno	80	240	1,440.00	6	18	81.00
Republic	......	......	......	10	30	150.00
Rice	82	205	1,435.00	6	24	96.00
Riley	11	33	182.00	1	4	18.00
Rooks	15	38	228.00	20	70	280.00
Rush	......	......	......	20	60	300.00
Russell	......	......	......	......	......	......
Saline	......	......	......	2	6	27.00
Scott	5	5	40.00	45	90	450.00
Sedgwick	73	256	1,536.00	12	36	162.00
Seward	......	......	......	145	435	2,175.00
Shawnee	7	28	168.00	104	364	1,820.00
Sheridan	......	......	......	15	37	166.50
Sherman	1	1	8.00	10	25	112.50
Smith	......	......	......	13	52	234.00
Stafford	30	75	450.00	......	......	......
Stanton	124	93	744.00	35	105	420.00
Stevens	10	20	140.00	......	......	......
Sumner	......	......	......	......	......	......
Thomas	......	......	......	......	......	......
Trego	20	20	160.00	35	105	525.00
Wabaunsee	......	......	......	5	20	80.00
Wallace	50	50	400.00	68	170	765.00
Washington	......	......	......	64	160	800.00
Wichita	51	51	408.00	10	20	100.00
Wilson	2	6	30.00	12	36	162.00
Woodson	......	......	......	23	69	345.00
Wyandotte	......	......	......	......	......	......

TAME GRASSES.

TABLE showing the number of acres for the year 1911.

COUNTIES.	Timothy.	Clover.	Blue grass.	Alfalfa.	Orchard grass.	Other tame grasses.
The State	367,402	203,073	183,570	976,094	3,889	55,380
Allen	13,425	4,258	2,560	783	25	1,044
Anderson	15,819	7,667	2,707	1,416	12	3,350
Atchison	11,295	5,965	14,132	2,355	67	1,192
Barber	....	....	....	12,596	....	....
Barton	....	....	2	8,055	....	....
Bourbon	29,442	4,397	2,659	1,166	77	3,701
Brown	17,044	13,307	15,258	5,821	20	889
Butler	174	118	1,329	33,097	....	121
Chase	....	....	278	13,058	....	....
Chautauqua	203	362	286	8,074	13	17
Cherokee	2,492	410	355	160	82	1,579
Cheyenne	....	....	....	1,338	....	5
Clark	....	....	....	4,761	....	....
Clay	21	4	227	16,456	5	31
Cloud	19	....	25	22,589	6	42
Coffey	5,203	11,282	1,391	2,176	6	2,643
Comanche	....	....	....	3,459	26	1
Cowley	111	313	1,435	29,563	19	505
Crawford	7,102	1,408	668	273	5	398
Decatur	....	....	....	6,986	....	....
Dickinson	68	....	707	27,449	227	161
Doniphan	9,528	12,023	13,509	3,151	357	1,532
Douglas	11,437	7,121	4,552	5,044	23	227
Edwards	....	....	....	2,947	....	....
Elk	1,334	6,354	874	9,625	32	772
Ellis	....	....	4	2,621	15	5
Ellsworth	....	....	20	10,117	....	3
Finney	....	....	....	10,180	....	....
Ford	....	....	1	7,864	20	150
Franklin	28,290	8,301	6,889	2,114	173	4,725
Geary	22	17	61	6,675	19	....
Gove	....	....	1	4,088	....	30
Graham	2	....	5	7,569	2	77
Grant	....	....	....	169	....	....
Gray	....	....	....	2,626	....	....
Greeley	....	10	....	218	....	....
Greenwood	1,580	4,190	890	16,210	70	255
Hamilton	....	2	....	3,727	....	....
Harper	13	....	10	13,805	1	....
Harvey	1	....	128	15,580	10	40
Haskell	....	....	....	....	....	....
Hodgeman	....	....	....	1,953	....	....
Jackson	18,847	6,060	5,557	3,892	542	1,075
Jefferson	18,539	13,492	18,709	4,960	95	789
Jewell	21	52	82	58,613	....	103
Johnson	16,994	10,343	15,566	1,682	14	890
Kearny	....	27	....	4,725	....	....
Kingman	....	10	2	5,271	....	32
Kiowa	1	1	2	665	....	....
Labette	13,704	4,393	2,322	1,279	166	3,545
Lane	....	....	....	2,751	....	....
Leavenworth	10,369	7,325	31,107	2,340	45	927
Lincoln	30	....	8	10,852	....	5
Linn	34,448	5,041	2,953	570	28	4,696
Logan	....	....	....	3,979	....	....
Lyon	2,474	5,652	2,019	12,828	5	3,815
Marion	146	52	747	20,186	50	64
Marshall	5,821	3,354	1,545	13,728	160	752
McPherson	30	....	159	18,328	....	1,235
Meade	....	....	3	11,863	5	8
Miami	31,927	12,732	9,517	974	358	4,834
Mitchell	....	....	33	23,555	....	....
Montgomery	3,458	1,810	1,793	3,786	45	676
Morris	317	330	280	12,362	11	23
Morton	....	....	....	....	....	....
Nemaha	18,489	5,241	2,027	8,983	39	1,199
Neosho	5,859	6,751	651	1,025	7	1,117
Ness	....	....	....	4,136	....	....
Norton	....	....	1	14,875	....	21
Osage	11,845	11,945	2,913	4,279	38	943
Osborne	....	....	2	22,251	....	2
Ottawa	....	....	3	12,330	8	78
Pawnee	....	....	....	6,956	....	....

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TAME GRASSES (ACRES), 1911—CONCLUDED.

COUNTIES.	Timothy.	Clover.	Blue grass.	Alfalfa.	Orchard grass.	Other tame grasses.
Phillips				28,358		
Pottawatomie	2,401	495	2,285	15,146	388	247
Pratt				2,889		
Rawlins				6,105		
Reno			77	16,449		114
Republic	1,622	219	420	32,366	19	441
Rice	13			17,549		77
Riley	9	5	304	16,734	5	26
Rooks	5		6	14,329		15
Rush				2,304		6
Russell				7,559		6
Saline			77	18,679	8	6
Scott				1,720		
Sedgwick	100	23	304	28,547	17	199
Seward				520		
Shawnee	4,623	5,200	4,442	9,188	366	1,746
Sheridan				4,920		
Sherman				1,495		
Smith	4			42,233		10
Stafford	7	1		4,401	4	
Stanton						
Stevens				40		
Sumner	37	41	1,031	24,266	13	113
Thomas				1,714		
Trego				4,433		9
Wabaunsee	855	2,424	1,397	14,726	35	744
Wallace				4,236		15
Washington	664	488	685	25,967	21	75
Wichita				692		
Wilson	4,969	6,677	1,277	4,174	49	801
Woodson	2,113	3,256	873	1,544	3	368
Wyandotte	2,036	2,124	1,428	873	33	38

TAME GRASSES.

TABLE showing the number of acres for the year 1912.

COUNTIES.	Timothy.	Clover.	Blue grass.	Alfalfa.	Orchard grass.	Other tame grasses.
The State	252,768	119,061	184,155	1,000,785	4,334	40,228
Allen	6,677	2,998	1,273	1,388	39	341
Anderson	10,415	5,581	3,077	1,910	4	850
Atchison	10,061	3,904	16,358	2,974	27	1,615
Barber				12,496		20
Barton				8,393	1	27
Bourbon	21,617	2,573	5,123	1,550	9	2,813
Brown	13,154	9,120	17,748	6,326	263	359
Butler	64	40	485	34,663	38	115
Chase	1		55	13,521		
Chautauqua	14	14	28	7,889	2	21
Cherokee	339	54	114	163	62	1,167
Cheyenne			10	1,113		
Clark				3,870		
Clay	6	9	42	17,310	5	9
Cloud	7			21,977	1	71
Coffey	2,522	8,819	714	3,530	45	1,880
Comanche		5		3,982		
Cowley	17	50	190	31,812	1	161
Crawford	4,803	542	357	420	37	607
Decatur			1	5,040		
Dickinson	33	3	83	28,416	349	102
Doniphan	7,808	6,501	10,209	5,534	954	1,777
Douglas	7,762	3,526	5,723	6,543		78
Edwards				3,143		20
Elk	454	930	241	8,357	44	284
Ellis				2,285		
Ellsworth			14	8,883	14	2
Finney				12,139		
Ford	4			6,604	76	114

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TAME GRASSES (ACRES), 1912—CONCLUDED.

COUNTIES.	Timothy.	Clover.	Blue grass.	Alfalfa.	Orchard grass.	Other tame grasses.
Franklin	22,386	5,823	4,963	2,615	462	4,625
Geary	4	13	42	7,385	14	....
Gove	....	....	....	3,484	....	....
Graham	....	10	....	5,662	....	....
Grant	....	5	....	168	....	....
Gray	....	....	....	1,410	....	....
Greeley	....	....	....	90	....	....
Greenwood	218	840	559	18,726	23	75
Hamilton	....	....	....	3,419	1	....
Harper	....	....	....	15,545	7	....
Harvey	....	....	56	16,087	36	12
Haskell	....	....	....	5	....	....
Hodgeman	....	....	....	1,800	....	....
Jackson	15,402	4,930	9,791	5,733	343	1,343
Jefferson	16,054	8,036	24,899	6,293	29	333
Jewell	40	8	74	58,984	8	12
Johnson	13,536	7,086	14,986	2,306	38	1,851
Kearny	....	....	....	5,062	....	....
Kingman	11	3	15	5,399	3	18
Kiowa	....	....	....	787	....	....
Labette	4,292	1,958	2,414	1,818	55	1,411
Lane	....	....	....	2,248	....	....
Leavenworth	8,097	3,696	25,288	6,348	64	1,360
Lincoln	....	....	....	10,711	....	....
Linn	23,187	5,297	3,938	884	6	3,270
Logan	....	....	....	3,002	....	....
Lyon	1,379	3,520	2,069	16,280	139	1,306
Marion	74	50	382	19,947	3	19
Marshall	4,678	1,471	1,469	16,638	87	649
McPherson	....	....	52	19,161	30	1,134
Meade	....	....	....	9,486	60	3
Miami	23,592	5,635	10,344	1,472	30	4,615
Mitchell	....	....	10	21,527	....	....
Montgomery	825	473	572	5,602	33	160
Morris	62	155	69	12,478	8	190
Morton	....	....	....	30	....	....
Nemaha	13,351	4,275	3,961	11,254	16	1,255
Neosho	2,447	3,461	411	1,302	16	542
Ness	....	....	....	3,771	....	....
Norton	....	....	....	10,684	50	6
Osage	6,890	6,892	1,417	5,493	15	135
Osborne	1	....	....	20,085	....	....
Ottawa	....	....	....	12,517	....	55
Pawnee	....	15	....	6,386	....	....
Phillips	....	....	73	21,159	....	4
Pottawatomie	1,397	756	1,994	17,439	10	316
Pratt	....	....	....	2,631	....	....
Rawlins	....	....	....	5,123	....	....
Reno	5	....	51	18,093	145	55
Republic	929	101	396	33,836	9	219
Rice	....	....	....	18,276	....	56
Riley	2	8	273	15,855	1	26
Rooks	....	....	....	12,763	....	1
Rush	....	....	....	2,571	....	....
Russell	....	....	....	6,295	....	10
Saline	....	....	10	19,448	....	25
Scott	....	....	....	985	....	20
Sedgwick	23	....	60	31,553	63	41
Seward	....	....	....	256	....	....
Shawnee	3,338	4,532	6,206	10,212	359	1,498
Sheridan	....	....	....	5,779	....	....
Sherman	....	....	....	1,723	....	1
Smith	....	....	....	40,116	25	7
Stafford	....	....	....	4,945	8	7
Stanton	....	....	....	....	....	....
Stevens	....	....	....	....	....	....
Sumner	....	10	89	28,077	....	106
Thomas	....	....	....	1,228	....	....
Trego	....	....	....	3,020	....	....
Wabaunsee	652	1,501	1,811	15,077	33	422
Wallace	....	....	....	3,155	....	....
Washington	467	235	463	28,803	....	94
Wichita	....	....	....	617	....	....
Wilson	1,223	1,514	784	6,310	....	141
Woodson	1,110	1,322	441	1,985	6	55
Wyandotte	1,338	761	1,878	1,140	128	312

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TAME HAY.

Table showing the number of tons cut in 1910 and 1911 and value.

Counties.	1910.		1911.	
	Tons.	Value.	Tons.	Value.
The State	1,784,886	$18,785,976.50	1,267.961	$11,916,011.00
Allen	12,136	$145,632.00	5,604	$56,040.00
Anderson	19,026	209,286.00	8,326	83,260.00
Atchison	20,527	246,324.00	11,927	137,160.50
Barber	12,543	112,887.00	15,513	147,373.50
Barton	18,869	207,559 00	20,012	190,114.00
Bourbon	23,068	276,816.00	19,320	212,520.00
Brown	42,895	471,845.00	30,616	367,392.00
Butler	41,821	334,568.00	47,753	429,777.00
Chase	30,928	247,424.00	37,628	338,652.00
Chautauqua	9,839	88,551.00	8,489	76,401.00
Cherokee	3,094	34,034.00	651	6,510.00
Cheyenne	3,261	39,132.00	1,622	12,165.00
Clark	4,066	40,660.00	6,305	56,745.00
Clay	30,429	334,719.00	13,501	135,010.00
Cloud	40,030	400,300.00	16,113	145,017.00
Coffey	11,815	106,335.00	8,039	80,390.00
Comanche	4,085	36,765.00	4,402	39,618.00
Cowley	31,298	281,682.00	39,071	351,639.00
Crawford	8,796	96,756.00	2,960	31,080.00
Decatur	10,557	105,570.00	9,044	67,830.00
Dickinson	46,115	461,150.00	27,116	271,160.00
Doniphan	24,961	299,532.00	21,798	261,576.00
Douglas	24,883	298,596.00	9,689	101,734.50
Edwards	2,969	29,690.00	3,644	32,796.00
Elk	16,044	160,440.00	12,080	102,680.00
Ellis	11,296	124,256.00	2,943	23,544.00
Ellsworth	13,192	145,112.00	6,909	58,726.50
Finney	22,677	226,770 00	12,044	108,396.00
Ford	12,918	116,262.00	20,257	182,313.00
Franklin	29,714	356,568.00	9,495	104,445.00
Geary	16,132	177,452.00	11,167	111,670.00
Gove	9,589	115,068.00	3,078	24,624.00
Graham	14,289	142,890.00	13,094	91,658.00
Grant	25	237 50	177	1,416.00
Gray	5,572	50,148.00	705	5,992.50
Greeley	60	780 00	....	....
Greenwood	29,599	266,391.00	29,137	247,664.50
Hamilton	3,123	34,353.00	3,238	29,142.00
Harper	18.813	188,120.00	17,547	175,470.06
Harvey	21,369	213,690.00	19,072	181,184.00
Haskell	....	....	....	....
Hodgeman	1,165	11,650.00	4.312	34,496.00
Jackson	20,952	251,424.00	11,240	101,160.00
Jefferson	30,103	361,236.00	18,645	136,450.00
Jewell	57,863	578,630 00	34,680	277,440.00
Johnson	24,109	289,308.00	5,994	65,934.00
Kearny	8,531	93,841.00	4,333	36,830.50
Kingman	3,343	33,430 00	5,181	46,629.00
Kiowa	964	9,640 00	908	8,172.00
Labette	16,096	193,152 00	7,283	65,547.00
Lane	5,678	65,297.00	3,212	25,696.00
Leavenworth	21,311	255,732.00	6,014	66,154.00
Lincoln	17,924	197,164.00	9.871	83,903 50
Linn	24,412	292,944.00	12,564	131,922.00
Logan	3,516	45,708 00	2,345	18,760.00
Lyon	24,756	222,804.00	22,619	214,880.50
Marion	37,056	333,504.00	27,556	275,560.00
Marshall	30,598	367,176.00	12,771	127,710.00
McPherson	25,178	251,780.00	16,979	169,790.00
Meade	11,146	111,460.00	12,836	128,360 00
Miami	26,883	322,596.00	6,601	66,010 00
Mitchell	35,677	392,447.00	16,551	132,408.00
Montgomery	9,859	108,449.00	9,288	92,880.00
Morris	16,189	145,701.00	12,841	115,569.00
Morton	....	....	....	....
Nemaha	28,270	325,105.00	13,381	133,810.00
Neosho	8,821	88,210.00	5,504	57,792.00
Ness	9,919	109,109.00	4,018	32,144.00
Norton	13,790	137,900.00	16,255	130,040.00
Osage	19,031	228,372.00	9,116	100,276.00
Osborne	25,227	227,043.00	15,869	126,952.00
Ottawa	22,982	229,820.00	15,860	150,670.00
Pawnee	14,074	140,740.00	15,570	132,345.00

TAME HAY—CONCLUDED.

COUNTIES.	1910.		1911.	
	Tons.	Value.	Tons.	Value.
Phillips	23,866	$214,794.00	24,936	$199,488.00
Pottawatomie	35,764	357,640.00	23,534	211,806.00
Pratt	1,966	19,660.00	1,290	11,610.00
Rawlins	6,805	81,660.00	6,919	51,892.50
Reno	21,015	231,165.00	23,348	221,806.00
Republic	51,094	562,034.00	25,004	225,036.00
Rice	22,363	223,630.00	21,593	194,337.00
Riley	30,479	335,269.00	18,362	183,620.00
Rooks	14,789	147,890.00	11,090	83,175.00
Rush	7,959	87,549.00	4,600	39,100.00
Russell	7,934	87,274.00	3,544	30,124.00
Saline	32,819	328,190.00	26,465	264,650.00
Scott	2,209	26,508.00	1,355	11,517.50
Sedgwick	24,404	219,636.00	38,296	421,256.00
Seward	760	6,840.00	1,008	9,072.00
Shawnee	23,206	278,472.00	16,896	202,752.00
Sheridan	10,756	118,316.00	8,687	60,809.00
Sherman	3,096	40,248.00	1,988	15,904.00
Smith	35,264	317,376.00	31,496	251,968.00
Stafford	5,484	54,840.00	9,832	88,488.00
Stanton	....	....	....	....
Stevens	....	....	....	....
Sumner	21,332	213,320.00	25,650	230,850.00
Thomas	1,401	18,213.00	1,823	13,672.50
Trego	16,774	218,062.00	2,279	18,232.00
Wabaunsee	32,174	337,827.00	17,957	161,613.00
Wallace	3,805	49,465.00	1,652	13,216.00
Washington	40,233	442,563.00	18,795	187,950.00
Wichita	799	10,387.00	756	6,426.00
Wilson	12,573	125,730.00	8,639	86,390.00
Woodson	5,152	56,672.00	3,267	32,670.00
Wyandotte	5,216	73,024.00	1,617	19,404.00

PRAIRIE GRASS.

TABLE showing acres under fence, tons of hay cut, and value.

COUNTIES.	Prairie fenced, 1911. Acres.	Prairie hay cut 1910.		Prairie fenced, 1912. Acres.	Prairie hay cut, 1911.	
		Tons.	Value.		Tons.	Value.
The State	14,423,730	1,146,802	$9,854,642.00	14,051,336	861,288	$6,583,506.50
Allen	96,069	24,106	$216,954.00	93,805	23,311	$186,488.00
Anderson	126,138	26,253	210,024.00	126,835	17,321	129,907.50
Atchison	38,449	3,228	32,280.00	45,478	2,281	20,529.00
Barber	301,832	1,041	7,287.00	283,511	1,646	13,168.00
Barton	124,349	11,505	103,545.00	115,435	7,514	60,112.00
Bourbon	125,459	24,551	220,959.00	117,018	23,493	199,690.50
Brown	50,429	1,734	17,340.00	53,227	1,345	12,105.00
Butler	338,469	45,696	319,872.00	282,143	36,160	253,120.00
Chase	263,316	8,195	57,365.00	263,306	12,975	90,825.00
Chautauqua	150,211	14,460	101,220.00	179,900	11,420	79,940.00
Cherokee	74,080	24,946	224,514.00	73,647	20,407	163,256.00
Cheyenne	133,650	3,821	38,210.00	141,142	2,738	15,059.00
Clark	325,011	1,463	11,704.00	266,613	1,139	7,978.00
Clay	109,809	15,837	142,533.00	106,967	6,428	54,638.00
Cloud	100,350	8,858	75,293.00	111,422	6,032	45,240.00
Coffey	113,233	30,529	244,232.00	134,173	27,687	221,496.00
Comanche	273,459	1,660	11,620.00	244,787	2,189	15,323.00
Cowley	257,590	21,066	147,462.00	258,273	29,702	222,765.00
Crawford	90,295	14,465	115,720.00	86,154	10,507	89,309.50
Decatur	190,610	565	5,085.00	159,609	693	3,811.50
Dickinson	161,901	22,223	200,007.00	152,424	14,035	119,297.50
Doniphan	14,910	478	4,780.00	27,794	1,159	11,590.00
Douglas	79,880	11,419	102,771.00	70,244	4,310	36,635.00
Edwards	71,387	1,803	14,424.00	66,342	2,037	14,259.00
Elk	182,124	20,183	141,281.00	133,678	19,837	138,859.00
Ellis	213,881	3,497	34,970.00	201,552	2,702	16,212.00
Ellsworth	187,932	7,751	77,510.00	183,835	2,561	17,927.00
Finney	128,643	3,335	30,015.00	170,714	1,395	9,765.00
Ford	158,888	2,455	19,640.00	128,305	3,916	27,412.00

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PRAIRIE GRASS—Concluded.

COUNTIES.	Prairie fenced, 1911. Acres.	Prairie hay cut, 1910.		Prairie fenced, 1912. Acres.	Prairie hay cut, 1911.	
		Tons.	Value.		Tons.	Value.
Franklin	126,778	16,750	$167,500.00	121,084	6,220	$49,760.00
Geary	115,045	12,629	119,975.50	113,551	6,920	58,820.00
Gove	152,848	968	9,680.00	152,725	794	4,764.00
Graham	162,760	4,177	37,593.00	164,473	1,541	7,705.00
Grant	51,799	453	3,624.00	53,815	874	5,244 00
Gray	66,129	1,140	11,520.00	66,129	1,270	8,890 00
Greeley	78,157	65	650.00	51,828	....	....
Greenwood	326,117	25,870	181,090.00	315,742	26,154	183,078.00
Hamilton	63,565	2,430	24,300.00	47,396	1,202	9,015.00
Harper	117,571	6,348	50,784.00	115,605	6,673	53,384.00
Harvey	79,508	14,712	117,696.00	75,451	12,589	100,712.00
Haskell	50,436	176	1,408.00	22,539	932	6,058.00
Hodgeman	248,450	747	4,482.00	252,026	2,371	14,226.00
Jackson	98,762	16,578	165,780.00	122,171	7,137	53,527.50
Jefferson	81,791	12,486	124,860.00	77,528	5,490	43,920.00
Jewell	143,798	9,063	81,567.00	143,188	5,873	41,111.00
Johnson	57,762	3,011	30,110.00	59,957	1,197	10,773.00
Kearny	56,613	1,003	10,030.00	44,215	502	3,514.00
Kingman	153,326	8,284	66,272.00	162,582	8,738	65,535.00
Kiowa	186,782	1,325	11,925.00	218,118	714	4,998.00
Labette	113,891	20,848	166,784.00	116,089	20,667	155,002.50
Lane	136,720	440	3,960.00	160,299	687	3,778.50
Leavenworth	53,789	5,441	54,410.00	58,367	1,719	16,330.50
Lincoln	178,949	7,858	70,722.00	164,123	3,879	27,153.00
Linn	112,434	10,406	93,654.00	100,837	7,496	59,968.00
Logan	165,959	750	7,500.00	207,981	669	4,348.50
Lyon	196,312	34,820	243,740.00	174,213	26,247	183,729.00
Marion	144,085	21,580	151,060.00	153,812	20,013	160,104.00
Marshall	164,025	26,045	260,450.00	156,657	11,107	94,409.50
McPherson	128,539	20,086	180,774.00	133,193	11,073	88,584.00
Meade	146,603	3,261	26,088.00	163,227	2,541	17,787.00
Miami	95,929	8,035	72,315.00	95,618	3,900	31,200.00
Mitchell	102,086	5,371	53,710.00	106,230	1,692	11,844.00
Montgomery	86,482	19,132	172,188.00	72,807	18,034	144,272.00
Morris	162,872	19,445	155,560.00	150,227	9,058	63,406.00
Morton	45,041	300	2,700.00	48,130	35	210,00
Nemaha	112,172	14,798	147,980.00	112,281	7,695	65,407.50
Neosho	105,219	23,873	190,984 00	108,603	24,117	192,936.00
Ness	234,431	2,464	22,176.00	185,708	2,720	14,960.00
Norton	152,026	946	7,568.00	153,691	4,520	27,120.00
Osage	135,488	30,656	275,904.00	131,399	15,591	132,523.50
Osborne	220,044	7,876	63,008.00	203,256	4,680	30,420.00
Ottawa	155,940	9,196	82,764.00	123,081	4,102	32,816.00
Pawnee	102,444	3,111	27,999.00	77,953	2,769	17,998.50
Phillips	176,501	6,763	54,104.00	164,551	13,162	72,391.00
Pottawatomie	219,274	33,245	299,205.00	210,010	15,494	116,205.00
Pratt	86,834	1,507	13,563.00	85,363	913	7,304.00
Rawlins	207,473	1,038	10,380.00	221,166	1,956	11,736.00
Reno	134,865	15,601	140,409.00	154,220	15,411	123,288.00
Republic	112,331	10,326	98,097.00	105,644	5,601	42,007.50
Rice	98,482	10,931	98,379.00	95,958	4,920	36,900.00
Riley	160,863	18,198	181,980.00	146,924	8,091	68,773 50
Rooks	168,654	4,713	37,704.00	161,481	5,228	28,754.00
Rush	136,615	4,437	39,933.00	125,554	4,170	27,105.00
Russell	234,357	5,722	51,498.00	205,955	2,031	13,201,50
Saline	113,044	12,073	120,730.00	127,604	7,702	65,467.00
Scott	106,305	1,197	11,970.00	95,172	1,137	7,390.50
Sedgwick	133,708	19,922	149,415.00	117,633	20,784	187,056.00
Seward	75,376	2,902	23,216.00	69,032	2,390	15,535.00
Shawnee	84,010	26,706	267,060.00	81,899	11,794	117,940.00
Sheridan	118,298	1,810	18,100.00	133,134	1,786	8,930.00
Sherman	211,546	2,011	20,110.10	178,840	1,299	8,443.50
Smith	163,000	8,813	70,504.00	158,832	12,834	83,421.00
Stafford	85,546	9,087	72,696.00	89,562	8,911	62,377.00
Stanton	24,240	....	....	32,733	....	....
Stevens	81,097	869	6,952.00	74,761	....	....
Sumner	147,199	11,385	91,080.00	147,594	16,802	126,015.00
Thomas	151,599	313	3,130.00	124,036	72	432.00
Trego	157,601	2,489	24,890.00	173,075	1,130	6,780.00
Wabaunsee	254,222	30,724	276,516.00	245,561	10,501	73,507.00
Wallace	86,524	1,878	18,780.00	106,943	906	6,342.00
Washington	164,888	25,783	244,938.50	166,703	11,451	97,333.50
Wichita	102,908	507	5,070.00	145,113	308	1,848.00
Wilson	111,353	30,599	244,792.00	124,110	28,219	211,642.50
Woodson	150,162	52,791	475,119.00	154,352	47,027	376,216.00
Wyandotte	13,024	86	860.00	11,583	111	1,110.00

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CORN AND WHEAT ON HAND.

TABLE showing the number of bushels on hand March 1, 1911, and March 1, 1912.

COUNTIES.	1911.		1912.	
	Corn.	Wheat.	Corn.	Wheat.
The State	37,746,382	9,209,375	19,236,377	2,831,512
Allen	245,134	4,720	233,048	3,575
Anderson	252,688	2,012	129,275	1,463
Atchison	695,251	42,675	362,365	84,090
Barber	107,518	86,577	133,244	11,910
Barton	418,656	926,580	148,952	180,455
Bourbon	332,583	1,780	210,590	2,255
Brown	1,567.255	9,480	959,810	72,540
Butler	352.261	3,200	310.105	2,280
Chase	193,672	....	87,251	2,770
Chautauqua	42,611	3,537	31,789	4,045
Cherokee	276,697	23,106	189,612	14,640
Cheyenne	159,662	45,187	12,681	12,923
Clark	54,775	137,009	24,735	13,774
Clay	917,947	133,829	321,107	74,795
Cloud	696,430	203,400	322,757	149,115
Coffey	382,162	4,470	272,313	9,226
Comanche	33,523	106,707	24,260	47,438
Cowley	254,866	44,937	344,668	13,440
Crawford	426,080	10.957	253,987	6,660
Decatur	29,623	23,244	2.397	276
Dickinson	775,231	61.828	370,888	56,663
Doniphan	685,866	47,620	690,501	56,075
Douglas	485,457	34,232	380,690	26,735
Edwards	132,428	339,976	148,525	84.916
Elk	61,739	290	51,416	5,924
Ellis	81,677	457,845	2,757	34,730
Ellsworth	331,102	230,315	45,696	41,530
Finney	4,795	2,237	125	37
Ford	90,465	327,865	69,275	80,300
Franklin	429,463	2,175	97,988	2,040
Geary	335,137	19,790	184,221	18,400
Gove	36,725	28.796	710	80
Graham	295,221	48.490	11,955	3,575
Grant	2,095	420	36	25
Gray	16.445	11,790	7,100	1,785
Greely	3,743	206	....	....
Greenwood	313,090	150	220,548	265
Hamilton	678	720	41	....
Harper	136,962	204.031	228,227	28,945
Harvey	378,466	34,078	214,065	37,749
Haskell	569	2,075	50	120
Hodgeman	28,190	66,300	1,080	4,970
Jackson	950,375	2.765	493,209	7,845
Jefferson	757,584	25,822	358,479	33,412
Jewell	1,589,859	72,689	658,371	46,790
Johnson	479.660	69,603	156,401	51,297
Kearny	1,050	520	160	40
Kingman	138.589	111,081	163,460	15,432
Kiowa	250.012	151,144	178,955	38,651
Labette	281.717	9,225	199,978	4,620
Lane	10.025	34,280	100	2,795
Leavenworth	275.680	53,280	74,372	42.630
Lincoln	462.658	164.375	66,539	21.030
Linn	298,480	2,315	172,785	2.640
Logan	31.780	3,655	905	260
Lyon	510,343	63,502	296.435	4,295
Marion	641,447	43,037	356,785	50,281
Marshall	1,769.760	39,025	671.497	45,570
McPherson	847,833	141,081	281,595	135,402
Meade	8.854	52,219	8,397	4.796
Miami	515 885	24.183	206,561	20,213
Mitchell	872,646	221.556	128,628	64.209
Montgomery	132,814	24,758	82,026	29,426
Morris	356,403	3,025	167,823	3,840
Morton	....	157	....	....
Nemaha	1,723,775	4.415	802,678	8,135
Neosho	326,363	11.130	237,158	4,518
Ness	44,458	59,791	2,270	4,805
Norton	45.155	53,945	12,138	4,247
Osage	489,260	1,415	116,073	1,875
Osborne	392,036	248,425	44,278	42,168
Ottawa	439,355	94.540	123,245	39,587
Pawnee	90,275	576,605	53,105	96,895

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CORN AND WHEAT ON HAND—CONCLUDED.

COUNTIES.	1911.		1912.	
	Corn.	Wheat.	Corn.	Wheat.
Phillips	311,797	82,537	106,369	13,636
Pottawatomie	839,691	5,975	436,247	4,896
Pratt	181,495	338,869	218,293	66,307
Rawlins	43,159	52,419	3,440	468
Reno	708,600	179,123	565,660	76,882
Republic	1,498,541	85,630	725,035	56,965
Rice	618,440	174,203	284,939	52,017
Riley	554,535	20,332	238,309	11,272
Rooks	169,358	164,463	16,337	28,499
Rush	71,780	459,736	6,708	48,360
Russell	293,061	529,969	22,611	87,352
Saline	469,560	114,090	140,366	40,127
Scott	10,674	5,025	355	227
Sedgwick	359,507	86,225	260,016	35,260
Seward	10,005	3,032	11,700	75
Shawnee	598,900	2,070	407,173	4,401
Sheridan	54,368	32,820	2,989	1,165
Sherman	56,558	22,649	1,271	2,034
Smith	1,197,408	84,487	669,522	39,806
Stafford	397,668	352,564	410,017	117,018
Stanton	20	....	....	....
Stevens	28,841	825	10,085	500
Sumner	215,112	110,612	285,324	33,240
Thomas	10,819	85,967	1,700	1,130
Trego	59,180	33,370	500	200
Wabaunsee	671,800	22,580	294,710	5,770
Wallace	20,939	1,887	1,044	108
Washington	1,170,413	68,852	606,091	66,323
Wichita	1,440	1,303	....	....
Wilson	206,032	11,597	216,028	13,060
Woodson	70,222	125	70,882	4,946
Wyandotte	47,455	28,340	6,460	14,230

CASTOR BEANS, TOBACCO AND COTTON.

TABLE giving the statistics of castor beans, tobacco and cotton for those counties reporting areas devoted to their growing in 1911.

COUNTIES.	Castor beans.			Tobacco.			Cotton.		
	Acres.	Bushels	Value.	Acres.	Pounds	Value.	Acres.	Pounds	Value.
The State	122	1,006	$1,257.50	154	134,700	$13,470	35	8,000	$800.00
Allen	....	....	....	10	9,000	$900	....	....	....
Anderson	85	680	$850.00	....	....	....	....	....	....
Chautauqua	....	....	....	1	800	80	....	....	....
Cherokee	10	100	125.00	....	....	....	....	....	....
Clark	....	....	....	....	....	....	20	4,000	$400.00
Ellis	....	....	....	35	17,500	1,750	....	....	....
Geary	1	10	12.50	....	....	....	....	....	....
Jackson	....	....	....	2	2,000	200	....	....	....
Jefferson	....	....	....	32	32,000	3,200	....	....	....
Labette	....	....	....	1	800	80	....	....	....
Leavenworth	....	....	....	66	66,000	6,600	....	....	....
Linn	....	....	....	1	1,000	100	....	....	....
Miami	....	....	....	4	4,000	400	....	....	....
Montgomery	....	....	....	2	1,600	160	5	1,500	150.00
Neosho	4	36	45.00	....	....	....	....	....	....
Sumner	20	160	200.00	....	....	....	10	2,500	250.00
Wyandotte	2	20	25.00	....	....	....	....	....	....

CASTOR BEANS, TOBACCO AND COTTON.

TABLE giving the statistics of castor beans, tobacco and cotton for those counties reporting areas devoted to their growing in 1912.

COUNTIES.	Castor Beans.			Tobacco.			Cotton.		
	Acres.	Bushels.	Value.	Acres.	Pounds.	Value.	Acres.	Pounds.	Value.
The State	86	760	$818.40	114	113,300	$11,330	61	9,260	$926
Allen				11	8,800	$880			
Atchison							2	600	$60
Chautauqua							10	2,500	250
Decatur	1	8	$10.00						
Dickinson	5	50	50.00						
Elk				15	9,000	900			
Ellis				26	10,400	1,040			
Grant	6	48	52.80						
Hodgeman				1	400	40			
Labette				1	700	70			
Leavenworth				39	62,400	6,240			
Linn	30	300	300.00	1	900	90			
Lyon	1	10	10.00						
Miami				17	17,000	1,700			
Montgomery							28	1,960	196
Nemaha							1	200	20
Neosho	42	336	386.40						
Seward	1	8	9.20						
Stevens							20	4,000	490
Woodson				1	700	70			
Wyandotte				2	3,000	300			

LIVE-STOCK STATISTICS.

TABLE showing the number and value of various kinds of live stock for the year 1911.

COUNTIES.	Horses.		Mules and asses.		Milch cows.	
	Number.*	Value.	Number.*	Value.	Number.*	Value.
The State	1,063,998	$120,231,774	222,869	$29,195,839	809,628	$32,384,920
Allen	9,657	$1,091,241	2,001	$262,131	7,241	$289,640
Anderson	9,933	1,122,429	2,185	286,235	8,616	344,640
Atchison	8,008	904,904	2,363	309,558	7,887	295,480
Barber	10,645	1,202,885	2,989	391,559	12,179	487,160
Barton	13,361	1,509,793	3,386	443,566	7,490	299,600
Bourbon	12,230	1,381,990	2,281	298,811	9,515	380,600
Brown	13,049	1,474,537	3,272	428,632	9,421	376,840
Butler	19,188	2,168,244	4,239	555,309	14,006	560,240
Chase	7,153	808,289	1,358	177,243	7,326	293,040
Chautauqua	8,702	983,326	1,956	256,236	7,709	308,360
Cherokee	11,443	1,293,059	3,103	406,493	8,610	344,400
Cheyenne	6,966	787,158	887	116,197	3.458	138,320
Clark	4,496	508,048	1,479	193,749	5,805	232,200
Clay	12,489	1,411,257	2,381	311,911	9,445	377,800
Cloud	14,297	1,615,561	2,410	315,710	8,968	358,720
Coffey	11,039	1,247,407	2,377	311,387	8,958	358,320
Comanche	4,996	564,548	1,411	184,841	7,381	295,240
Cowley	17,841	2,016,033	4,156	544,436	13,584	543,360
Crawford	12,798	1,446,174	2,606	341,386	9,121	364,840
Decatur	8,846	999,598	1,077	141,087	5,274	210,960
Dickinson	15,574	1,759,862	2,109	276,279	14,224	568,960
Doniphan	7,245	818,685	2,954	386,974	5,650	226,000
Douglas	10,271	1,160,623	1,758	230,298	8,420	336,800
Edwards	6,937	783,881	2,314	303,134	4,022	160,880
Elk	8,132	918,916	2,441	319,771	6.673	266,920
Ellis	12,594	1,423,122	897	117,507	8,432	337,280
Ellsworth	9,846	1,056,098	1,882	246,542	6,911	276,440
Finney	5,072	573,136	1,478	192,963	4,324	172,960
Ford	9,556	1,079,828	2,178	285,818	5,977	239,080

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LIVE-STOCK STATISTICS, 1911—CONTINUED.

COUNTIES.	Horses.		Mules and asses.		Milch cows.	
	Number.*	Value.	Number.*	Value.	Number.*	Value.
Franklin	11,299	$1,276,787	2,111	$276,541	9,482	$379,280
Geary	5,454	616,302	791	103,621	6,007	240,280
Gove	7,325	827,725	1,125	147,375	3,956	158,240
Graham	9,975	1,127,175	1,789	234,359	6,706	268,240
Grant	2,285	258,205	458	59,998	2,314	92,560
Gray	4,218	476,634	943	123,533	2,802	112,080
Greeley	2,544	287,472	332	43,492	1,858	74,320
Greenwood	13,132	1,483,916	3,358	439,898	10,304	412,160
Hamilton	3,193	360,809	453	59,343	3,926	157,040
Harper	12,402	1,401,426	3,294	431,514	7,454	298,160
Harvey	10,567	1,194,071	2,083	272,873	7,324	292,960
Haskell	2,063	233,119	283	37,073	1,242	49,680
Hodgeman	5,962	673,706	843	110,433	6,157	246,280
Jackson	12,030	1,359,390	2,704	354,224	9,637	385,480
Jefferson	11,209	1,266,617	2,895	379,245	8,584	343,360
Jewell	19,586	2,213,218	4,641	607,971	10,556	422,240
Johnson	10,263	1,159,719	2,477	324,487	8,735	349,400
Kearny	3,537	399,681	676	88,556	2,988	119,520
Kingman	12,672	1,431,936	3,369	441,339	9,868	394,720
Kiowa	6,725	759,925	2,733	358,023	5,065	202,600
Labette	11,803	1,333,739	3,240	424,440	10,850	434,000
Lane	4,701	531,213	948	124,188	2,615	104,600
Leavenworth	8,317	939,821	2,380	311,780	9,361	374,440
Lincoln	10,660	1,204,580	2,030	265,930	9,419	376,760
Linn	10,278	1,161,414	2,168	284,008	7,604	304,160
Logan	5,912	668,056	1,111	145,541	3,178	127,120
Lyon	13,414	1,515,782	2,636	345,316	12,049	481,960
Marion	17,683	1,998,179	1,789	234,359	14,132	565,280
Marshall	17,291	1,953,883	3,490	457,190	13,414	536,560
McPherson	17,381	1,964,053	2,343	306,933	11,495	459,800
Meade	6,050	683,650	1,015	132,965	4,883	195,320
Miami	11,634	1,314,642	2,444	320,164	8,245	329,800
Mitchell	13,874	1,567,762	2,813	368,503	8,508	340,320
Montgomery	12,992	1,468,096	2,881	377,411	10,270	410,800
Morris	9,811	1,108,643	1,682	220,342	9,572	382,880
Morton	1,938	218,994	640	83,840	2,535	101,400
Nemaha	15,272	1,725,736	2,746	359,726	10,744	429,760
Neosho	11,071	1,251,023	2,416	316,496	8,657	346,280
Ness	9,283	1,048,979	929	121,699	8,436	337,440
Norton	11,406	1,288,878	1,837	240,647	7,330	293,200
Osage	13,242	1,496,346	2,322	304,182	11,032	441,280
Osborne	14,365	1,623,245	2,424	317,544	11,091	443,640
Ottawa	10,310	1,165,030	2,223	291,213	7,861	314,440
Pawnee	10,428	1,178,364	2,627	344,137	4,427	177,080
Phillips	14,354	1,622,002	2,974	389,594	10,033	401,320
Pottawatomie	12,792	1,445,496	2,444	319,902	14,025	561,000
Pratt	9,908	1,119,604	3,451	452,081	4,910	196,400
Rawlins	8,959	1,012,367	920	120,520	4,384	175,360
Reno	21,568	2,437,184	6,056	793,336	14,600	584,000
Republic	16,122	1,821,786	3,117	408,327	10,149	405,960
Rice	11,920	1,346,960	3,526	461,906	7,476	299,040
Riley	8,589	970,557	1,684	220,604	10,573	422,920
Rooks	11,955	1,350,915	2,714	355,534	8,539	341,560
Rush	10,794	1,219,722	1,334	174,754	5,935	237,400
Russell	13,033	1,472,729	1,562	204,622	11,374	454,960
Saline	11,564	1,306,732	2,041	267,371	9,142	365,680
Scott	4,680	528,840	803	105,193	1,983	79,320
Sedgwick	20,784	2,348,592	3,808	498,848	13,949	557,960
Seward	2,747	310,411	854	111,874	2,900	116,000
Shawnee	13,776	1,556,688	2,248	294,488	11,123	444,920
Sheridan	7,846	886,598	1,284	168,204	3,979	159,160
Sherman	5,993	677,209	487	63,797	3,904	156,160
Smith	15,168	1,713,984	3,355	439,505	10,760	430,400
Stafford	10,101	1,141,413	4,848	635,088	6,326	253,040
Stanton	2,018	228,034	220	28,820	2,773	110,920
Stevens	3,239	366,007	761	99,691	2,679	107,160
Sumner	21,012	2,374,356	4,820	631,420	11,675	467,000
Thomas	7,203	813,939	980	128,380	3,146	125,840
Trego	6,755	763,315	1,030	134,930	6,859	274,360
Wabaunsee	10,497	1,186,161	2,016	264,096	12,292	491,680
Wallace	4,356	492,228	675	88,425	3,328	133,120
Washington	15,543	1,756,359	2,981	390,511	13,624	544,960
Wichita	3,078	347,814	358	46,898	2,044	81,760
Wilson	9,666	1,092,258	2,412	315,972	7,463	298,520
Woodson	5,490	620,370	1,572	205,932	5,569	222,760
Wyandotte	5,067	572,571	1,126	147,506	3,307	132,280

* **Records of the State Tax Commission.**

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LIVE-STOCK STATISTICS—Continued.

Table showing the number and value of various kinds of live stock for the year 1912.

Counties.	Horses.		Mules and asses.		Milch cows.	
	Number.*	Value.	Number.*	Value.	Number.*	Value.
The State	1,045,426	$118,133,138	232,751	$30,490,881	896,068	$39,873,060
Allen	9,802	$1,107,626	2,171	$284,401	7,934	$357,030
Anderson	10,095	1,140,735	2,277	298,287	9,284	417,780
Atchison	7,787	879,931	2,355	308,505	7,668	345,060
Barber	10,391	1,174,183	3,142	411,602	13,429	604,305
Barton	13,209	1,492,617	3,492	457,452	8,277	372,465
Bourbon	12,962	1,464,706	2,510	328,810	10,835	487,575
Brown	12,473	1,409,449	3,406	446,186	10,982	494,190
Butler	19,593	2,214,009	4,613	604,303	16,872	759,240
Chase	5,947	672,011	1,255	164,405	7,525	338,625
Chautauqua	8,485	958,805	2,158	282,698	9,059	407,655
Cherokee	11,173	1,262,549	3,185	417,235	9,767	439,515
Cheyenne	6,840	772,920	674	88,294	3,554	159,930
Clark	4,771	539,123	1,674	219,294	6,892	310,140
Clay	11,504	1,299,952	2,241	293,571	10,615	477,675
Cloud	13,996	1,581,548	2,535	332,085	9,775	439,875
Coffey	11,224	1,268,312	2,635	345,185	10,949	492,705
Comanche	5,276	596,188	1,717	224,927	9,208	414,360
Cowley	17,988	2,032,644	4,596	602,076	15,900	715,500
Crawford	12,237	1,382,781	2,790	365,490	10,120	455,400
Decatur	8,064	911,232	1,078	141,218	4,371	196,695
Dickinson	15,543	1,756,359	2,462	322,522	17,335	780,075
Doniphan	7,110	803,430	2,831	370,861	6,524	293,580
Douglas	10,147	1,146,611	1,658	217,198	9,010	405,450
Edwards	7,098	802,074	2,482	325,142	4,447	200,115
Elk	8,154	921,402	2,713	355,403	7,988	359,460
Ellis	12,576	1,421,088	877	114,887	7,272	327,240
Ellsworth	9,865	1,114,745	1,973	258,463	7,824	352,080
Finney	5,035	568,955	1,276	167,156	4,583	206,235
Ford	10,038	1,134,294	2,561	335,491	6,819	306,855
Franklin	10,798	1,220,174	2,177	285,187	10,571	475,695
Geary	5,430	613,590	824	107,944	7,196	323,820
Gove	5,930	670,090	815	106,765	2,793	125,685
Graham	8,824	997,112	1,677	219,687	6,349	285,705
Grant	2,215	250,295	553	72,443	2,100	94,500
Gray	4,046	457,198	1,206	157,986	3,197	143,865
Greeley	2,414	272,782	252	33,012	2,184	98,280
Greenwood	12,978	1,466,514	3,574	468,194	11,885	534,825
Hamilton	2,996	338,548	553	72,443	4,487	201,915
Harper	12,210	1,379,730	3,381	442,911	8,492	382,140
Harvey	11,132	1,257,916	2,254	295,274	7,992	359,640
Haskell	2,100	237,300	365	47,815	1,650	74,250
Hodgeman	6,026	680,938	992	129,952	6,456	290,520
Jackson	12,996	1,468,548	2,995	392,345	10,783	485,235
Jefferson	10,665	1,205,145	3,008	394,048	9,906	445,770
Jewell	19,094	2,157,622	4,907	642,817	11,394	512,730
Johnson	9,713	1,097,569	2,450	320,950	8,011	360,495
Kearny	3,207	362,391	746	97,726	3,056	137,520
Kingman	12,516	1,414,308	3,575	468,325	11,408	513,360
Kiowa	6,956	786,028	2,900	379,900	5,252	236,340
Labette	12,019	1,358,147	3,294	431,514	11,981	539,145
Lane	4,555	514,715	895	117,245	2,517	113,265
Leavenworth	7,574	855,862	2,492	326,452	8,838	397,710
Lincoln	10,484	1,184,692	2,262	296,322	10,736	483,120
Linn	10,159	1,147,967	2,336	306,016	8,517	383,265
Logan	5,298	598,674	961	125,891	2,722	122,490
Lyon	13,472	1,522,336	3,017	395,227	13,692	616,140
Marion	18,308	2,068,804	1,726	226,106	14,963	673,335
Marshall	17,150	1,937,950	3,272	428,632	14,573	655,785
McPherson	16,906	1,910,265	2,433	318,723	13,115	590,175
Meade	6,390	722,070	1,113	145,803	6,964	313,380
Miami	11,649	1,316,337	2,740	358,940	9,329	419,805
Mitchell	13,476	1,522,788	2,864	375,184	9,813	441,585
Montgomery	12,568	1,420,184	3,396	444,876	11,271	507,195
Morris	9,773	1,104,349	1,784	233,704	10,678	480,510
Morton	2,035	229,955	681	89,211	2,629	118,305
Nemaha	14,586	1,648,218	2,823	369,813	11,702	526,590
Neosho	11,463	1,295,319	2,414	316,234	9,850	420,750
Ness	8,873	1,002,649	1,027	134,537	7,030	316,350
Norton	11,354	1,283,002	1,968	257,808	7,492	337,140
Osage	12,451	1,406,963	2,448	320,688	12,233	550,485
Osborne	14,046	1,587,198	2,628	344,268	11,464	515,880
Ottawa	10,460	1,181,980	2,418	316,758	9,783	440,235
Pawnee	10,685	1,207,405	2,775	363,525	5,070	228,150

LIVE-STOCK STATISTICS, 1912—CONTINUED.

COUNTIES.	Horses.		Mules and asses.		Milch cows.	
	Number.*	Value.	Number.*	Value.	Number.*	Value.
Phillips	13,882	$1,568,666	3,108	$407,148	10,764	$484,380
Pottawatomie	11,761	1,328,993	2,475	324,225	17,764	799,380
Pratt	9,955	1,124,915	3,671	480,901	5,346	240,570
Rawlins	8,636	975,868	858	112,398	4,055	182,475
Reno	20,653	2,333,789	6,811	892,241	16,217	729,765
Republic	15,144	1,711,272	3,210	420,510	11,099	499,455
Rice	11,826	1,336,338	3,591	470,421	8.437	379,665
Riley	8,269	934,397	1,821	238,551	12,043	541,935
Rooks	11,511	1,300,743	2,466	323,046	8,909	400,905
Rush	10,689	1,207,857	1,450	189,950	6,038	271,710
Russell	13,029	1,472,277	1,539	201,609	10,839	487,755
Saline	11,416	1,290,008	2,246	294,226	11.264	506,880
Scott	4.296	485,448	612	80,172	1,750	78,750
Sedgwick	19,963	2.255,819	3,825	501,075	15,458	695,610
Seward	2,859	323.067	1,008	132,048	3,275	147,375
Shawnee	13,684	1,546,292	2,190	286,890	12,021	540,945
Sheridan	7,107	803,091	1,171	153,401	3,343	150,435
Sherman	5,988	676,644	492	64,452	4.124	185,580
Smith	16,312	1,843,256	3,519	460,989	11,842	532,890
Stafford	9,990	1.128,870	5,067	663,777	6,693	301,185
Stanton	2,182	246,566	257	33,667	2,300	103,500
Stevens	3,327	375,951	868	113,708	3,385	152,325
Sumner	20,775	2,347,575	4,998	654,738	13,770	619,650
Thomas	5,883	664,779	760	99,560	2,563	115,335
Trego	6,447	728,511	865	113,315	5,224	235,080
Wabaunsee	10,058	1,135,989	2,135	279,685	13,206	594,270
Wallace	4,265	481,945	653	85,543	2,998	134,910
Washington	14,447	1,632,511	2,972	389,332	14,668	660,060
Wichita	3,064	346,232	343	44,933	2,074	93,330
Wilson	9.802	1,107,626	2,702	353,962	8,834	397,530
Woodson	5,584	630.992	1,726	226,106	6,003	270,135
Wyandotte	5,265	594,945	1,034	135.454	3.320	149,400

*** Records of the State Tax Commission.**

TABLE showing the number and value of various kinds of live stock for the year 1911.

COUNTIES.	Other cattle.		Sheep.		Swine.	
	Number.	Value.	Number.*	Value.	Number.	Value.
The State	1,706,266	$46,069,182	326,684	$1,372,072.80	2,237,870	$22,378,700
Allen	9,559	$258,093	2,301	$9,664.20	19,384	$193,840
Anderson	15,612	421,524	3,332	13,994.40	25,306	253,060
Atchison	8,229	222,183	3,832	16,094.40	21,354	213,540
Barber	30,362	819,774	5,347	22,457.40	16,758	167,580
Barton	11,550	311,850	454	1,906.80	13,070	130,700
Bourbon	14.755	398,385	2,764	11,608.80	23,877	238,770
Brown	15,096	407,592	4,474	18,790.80	42,135	421,350
Butler	49,764	1,343,628	12,107	50,849.40	50,868	508,680
Chase	28.511	769,797	8,276	34,759.20	13,876	138,760
Chautauqua	21,018	567,486	1,776	7,459.20	13,697	136,970
Cherokee	10,139	273,753	2,072	8,702.40	20,322	203,220
Cheyenne	5,213	140,751	59	247.80	4,850	48,500
Clark	31,119	840,213	4,411	18,526.20	2,879	28,790
Clay	21,452	579,204	468	1,965.60	33,274	332,740
Cloud	15,526	419,202	16,462	69,140.40	26,372	263,720
Coffey	18,848	508,896	2,715	11,403.00	28,804	288,040
Comanche	19,801	534,627	2,965	12,453.00	5,291	52,910
Cowley	37,839	1,021,653	3,495	14,679.00	43,891	438,910
Crawford	13,095	353,565	3,557	14,939.40	21,750	217,500
Decatur	7,994	215,838	1.815	7,623.00	15,361	153,610
Dickinson	32,990	890,730	3,752	15,758.40	44,207	442,070
Doniphan	9,093	245,511	6,370	26,754.00	29,974	299,740
Douglas	12,754	344,358	5,822	24,452.40	28,522	285,220
Edwards	4,880	131,760	13	54.60	5,186	51,860
Elk	18,955	511,785	1,363	5,724.60	21,113	211,130
Ellis	14.767	398,709	827	3,473.40	8,728	87,280
Ellsworth	28.834	778,518	80	336.00	18,867	188,670
Finney	12,243	330,561	4,175	17,535.00	1,298	12,980
Ford	10,115	273,105	26	109.20	5,461	54,610

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LIVE-STOCK STATISTICS, 1911—CONTINUED.

COUNTIES.	Other cattle.		Sheep.		Swine.	
	Number.	Value.	Number.*	Value.	Number.	Value.
Franklin	17,681	$477,387	2,490	$10,458.00	31,568	$315,680
Geary	17,661	476,847	284	1,192.80	13,919	139,190
Gove	5,583	150,741	294	1,234.80	4,385	43,850
Graham	12,651	341,577	627	2,633.40	18,518	185,180
Grant	6,910	186,570	695	2,919.00	456	4,560
Gray	3,975	107,325	1,022	4,292.40	869	8,690
Greeley	5,207	140,589	910	3,822.00	385	3,850
Greenwood	46,356	1,251,612	4,081	17,140.20	34,595	345,950
Hamilton	9,245	249,615	4,879	20,491.80	838	8,380
Harper	13,996	377,892	935	3,927.00	25,783	257,830
Harvey	14,655	395,685	3,330	13,986.00	25,718	257,180
Haskell	2,808	75,816	2,806	11,785.20	339	3,390
Hodgeman	14,122	381,294	1,257	5,279.40	1,663	16,630
Jackson	14,758	398,466	4,144	17,404.80	34,879	348,790
Jefferson	17,753	479,331	3,223	13,536 60	38,026	380,260
Jewell	24,036	648,972	11,877	49,883.40	88.989	889,890
Johnson	9,383	253,341	6,715	28,203.00	30,144	301,440
Kearny	7,157	193,239	139	583.80	1,031	10,310
Kingman	21,629	583,983	541	2,272.20	20,320	203,200
Kiowa	12,289	331,803	16	67.20	6,331	63,310
Labette	18,742	506,034	4,465	18,753.00	29,045	290,450
Lane	5,874	158,598	565	2,373.00	1,785	17,850
Leavenworth	9,643	260,361	2,262	9,500.40	20,233	202,330
Lincoln	32,909	888,543	474	1,990 80	21,584	215,840
Linn	11,298	305,046	4,487	18,845.40	21,762	217,620
Logan	4,756	128,412	3,256	13,675.20	2,280	22,800
Lyon	36,520	986,040	4,955	20,811.00	30,586	305,860
Marion	34,201	923,427	5,593	23,490.60	31,410	314,100
Marshall	22,760	614,520	591	2,482.20	43,818	438,180
McPherson	30,903	834,381	8,320	34,944.00	44,700	447,000
Meade	9,039	244,053	748	3,141.60	3,803	38,030
Miami	11,246	303,642	5,981	25,120.20	36,929	369,290
Mitchell	21,606	583,362	19,534	82,042.80	38,217	382,170
Montgomery	13,341	360,207	897	3,767.40	24,421	244,210
Morris	28,773	776,871	1,193	5,010.60	28,213	282,130
Morton	5,638	152,226	1	4.20	330	3,300
Nemaha	20,559	555,093	4,584	19,252.80	59,658	596,580
Neosho	14,156	382,212	3.696	15,523.20	22,336	223,360
Ness	13,818	373,086	293	1,230.60	3,896	38,960
Norton	9,756	263,412	2,466	10,357.20	16,605	166,050
Osage	22,442	605,934	3,901	16,384.20	33,984	339,840
Osborne	26,342	711,234	2,215	9,303.00	33,870	338,700
Ottawa	25,913	699,651	653	2,742.60	20,630	206,300
Pawnee	5,842	157,734	37	155.40	7,895	78,950
Phillips	15,949	430,623	4,240	17,808.00	39,591	395,910
Pottawatomie	34,426	929,502	4,705	19,761.00	42,349	423,490
Pratt	6,421	173,367	1,021	4,288.20	9,488	94,880
Rawlins	6,856	185,112	3,446	14,473.20	6,759	67,590
Reno	25,289	682,803	10,560	44,352.00	38,534	385,340
Republic	21,267	574,209	3,409	14,317.80	64,738	647,380
Rice	16,829	454,383	120	504.00	27,496	274,960
Riley	28,218	761,886	2,590	10,878.00	38,270	382,700
Rooks	17,322	467,694	5,461	22,936.20	19,937	199,370
Rush	8,964	242,028	118	495.60	5,149	51,490
Russell	19,591	528,957	734	3,082.80	14,380	143,800
Saline	28,623	772,821	1,281	5,380.20	23,645	236,450
Scott	3,282	88,614	11	46.20	1,425	14,250
Sedgwick	19,208	518,616	4,056	17,035.20	44,489	444,890
Seward	5,748	155,196	2,239	9,403.80	1,481	14,810
Shawnee	13,934	376,218	2,806	11,785.20	21,657	216,570
Sheridan	6,861	185,247	451	1,894.20	9,590	95,900
Sherman	8,756	236,412	45	189.00	2,158	21,580
Smith	21,342	576,234	851	3,574.20	67,671	676,710
Stafford	8,637	233,199	356	1,495.20	12,631	126,310
Stanton	4,773	128,871	12,286	51,601.20	269	2,690
Stevens	5,800	156,600	1,006	4,225.20	1,035	10,350
Sumner	16,788	453,276	1,451	6,094.20	43,595	435,950
Thomas	4,607	124,389	170	714.00	2,424	24,240
Trego	12,898	348,246	1,176	4,939.20	7,460	74,600
Wabaunsee	36,103	974,781	8,917	37,451.40	26,650	266,500
Wallace	5,070	136,890	1,901	7,984.20	1,250	12,500
Washington	27,774	749,898	8,290	34,818.00	62,437	624,370
Wichita	4,550	122,850	2,500	10,500.00	750	7,500
Wilson	14,221	383,967	1,918	8,055.60	22,112	221,120
Woodson	10,949	295,623	955	4,011.00	11.718	117,180
Wyandotte	1,165	31,455	1,072	4,502.40	3,511	35,110

* Records of the State Tax Commission.

LIVE STOCK STATISTICS—CONTINUED.

TABLE showing the number and value of various kinds of live stock for the year 1912.

COUNTIES.	Other cattle.		Sheep.		Swine.	
	Number.	Value.	Number.*	Value.	Number.	Value.
The State	1,520,268	$48,648,416	208,755	$887,208.75	1,718,483	$17,184,830
Allen	9,303	$297,696	2,279	$9,685.75	18,538	$185,380
Anderson	13,800	441,600	1,919	8,155.75	22,717	227,170
Atchison	6,553	209,696	1,111	4,721.75	16,194	161,940
Barber	29,181	932,192	3,926	16,685.50	14,899	148,990
Barton	11,352	363,264	3,106	13,200.50	7,116	71,160
Bourbon	13,055	417,760	3,096	13,158.00	23,948	239,480
Brown	13,769	440,608	4,289	18,228.25	23,160	231,600
Butler	55,488	1,775,616	8,320	35,360.00	34,414	344,140
Chase	31,870	1,019,840	727	3,089.75	11,634	116,340
Chautauqua	22,174	709,568	363	1,542.75	10,867	108,670
Cherokee	8,285	265,120	2,905	12,346.25	13,288	132,880
Cheyenne	3,949	126,368	63	267.75	3,250	32,500
Clark	28,006	896,192	4,425	18,806.25	3,090	30,900
Clay	16,970	543,040	500	2,125.00	26,402	264,020
Cloud	12,905	412,960	989	4,203.25	25,142	251,420
Coffey	18,406	588,992	2,498	10,616.50	32,291	322,910
Comanche	20,530	656,960	3,102	13,183.50	3,100	31,000
Cowley	40,865	1,307,680	6,531	27,756.75	27,519	275,190
Crawford	11,015	352,480	3,595	15,278.75	17,512	175,120
Decatur	4,936	157,952	511	2,171.75	8,721	87,210
Dickinson	30,940	990,080	2,120	9,010.00	33,630	336,300
Doniphan	8,295	265,440	2,592	11,016 00	23,863	238,630
Douglas	10,339	330,848	3,849	16,358.25	24,601	246,010
Edwards	5,511	176,352	37	157.25	5,964	59,640
Elk	21,594	691,008	1,103	4,687.75	15,918	159,180
Ellis	9,692	310,144	530	2,252.50	5,607	56,070
Ellsworth	22,492	719,744	162	688.50	11,316	113,160
Finney	9,456	302,592	3,118	13,251.50	1,041	10,410
Ford	10,217	326,944	37	157.25	4,517	45,170
Franklin	12,014	384,448	3,108	13,209 00	27,578	275,780
Geary	16,513	528,416	308	1,309.00	12,168	121,680
Gove	2,692	86,144	81	344.25	2,110	21,100
Graham	9,033	289,056	260	1,105.00	4,860	48,600
Grant	5,022	160,704	943	4,007 75	410	4,100
Gray	4,012	128,384	830	3,527.50	985	9,850
Greeley	5,061	161,952	45	191.25	225	2,250
Greenwood	46,981	1,503,392	1,932	8,211.00	31,831	318,310
Hamilton	7,988	255,616	5,458	23,196.50	485	4,850
Harper	14,690	470,080	538	2,286.50	12,262	122,620
Harvey	14,104	451,328	5,464	23,222.00	20,771	207,710
Haskell	2,816	90,112	1,116	4,743.00	273	2,730
Hodgeman	10,572	338,304	916	3,893.00	1,249	12,490
Jackson	13,594	435,008	2,187	9,294 75	29,860	298,600
Jefferson	14,770	472,640	3,017	12,822.25	35,416	354,160
Jewell	16,302	521,664	708	3,009.00	57,771	577,710
Johnson	6,979	223,328	3,823	16,247.75	16,845	168,450
Kearny	8,282	265,024	309	1,313 25	585	5,850
Kingman	22,701	726,432	251	1,066.75	16,505	165,050
Kiowa	11,591	370,912	21	89.25	5,918	59,180
Labette	18,077	578,464	4,612	19,601.00	24,588	245,880
Lane	4,141	132,512	72	306.00	1,148	11,480
Leavenworth	71,117	227,744	1,312	5,576.00	14,824	148,240
Lincoln	28,052	897,664	909	3,863.25	14,795	147,950
Linn	10,416	333,312	3,109	13,213.25	20,782	207,820
Logan	3,871	123,872	2,620	11,135.00	1,394	13,940
Lyon	30,288	969,216	6,550	27,837.50	29,645	296,450
Marion	28,674	917,568	2,435	10,348.75	23,787	237,870
Marshall	18,438	590,016	860	3,655.00	42,668	426,680
McPherson	26,394	844,608	738	3,136.50	31,903	319,030
Meade	9,872	315,904	702	2,983.50	3,517	35,170
Miami	11,063	354,016	4,072	17,306.00	32,677	326,770
Mitchell	21,945	702,240	9,162	38,938.50	23,116	231,160
Montgomery	12,383	396,256	1,189	5,053.25	25,692	256,920
Morris	23,981	767,392	1,705	7,246.25	22,773	227,730
Morton	5,182	165,824	2	8.50	541	5,410
Nemaha	15,396	492,672	2,998	12,741.50	51,287	512,870
Neosho	11,484	367,488	3,192	13,566.00	22,107	221,070
Ness	10,271	328,672	248	1,054.00	1,708	17,080
Norton	9,457	302,624	1,525	6,481.25	9,791	97,910
Osage	17,948	574,336	2,347	9,974.75	29,756	297,560
Osborne	20,495	655,840	788	3,349.00	20,303	203,030
Ottawa	23,146	740,672	874	3,714.50	16,590	165,900
Pawnee	5,948	190,336	169	718.25	7,023	70,230

LIVE-STOCK STATISTICS, 1912—CONTINUED.

COUNTIES.	Other cattle.		Sheep		Swine.	
	Number.	Value.	Number.*	Value.	Number.	Value.
Phillips	14,658	$469,056	1,753	$7,450.25	20,897	$208,970
Pottawatomie	32,354	1,035,328	3,106	13,200.50	36,900	369,000
Pratt	6,643	212,576	1,056	4,488.00	8,806	88,060
Rawlins	4,329	138,528	437	1,857.25	4,161	41,610
Reno	25,129	804,128	7,737	32,882.25	29,825	298,250
Republic	16,362	523,584	2,320	9,860.00	41,694	416,940
Rice	15,951	510,432	2,532	10,761.00	26,897	268,970
Riley	24,447	782,304	1,286	5,465.50	26,566	265,660
Rooks	12,591	402,912	1,333	5,665.25	11,810	118,100
Rush	7,256	232,192	153	650.25	3,592	35,920
Russell	14,311	457,952	399	1,695.75	10,170	101,700
Saline	26,904	860,928	1,047	4,449.75	15,951	159,510
Scott	2,960	94,720	2	8.50	1,174	11,740
Sedgwick	17,923	573,536	7,588	32,249.00	29,056	290,560
Seward	6,165	197,280	85	361.25	1,492	14,920
Shawnee	13,722	439,104	2,068	8,789.00	18,919	189,190
Sheridan	3,599	115,168	275	1,168.75	3,857	38,570
Sherman	5,970	191,040	57	242.25	1,004	10,040
Smith	17,707	566,624	1,737	7,382.25	43,989	439,890
Stafford	9,026	288,832	375	1,593.75	11,017	110,170
Stanton	5,747	183,904	1,233	5,240.25	174	1,740
Stevens	5,273	168,736	1,200	5,100.00	1,389	13,890
Sumner	17,428	557,696	2,522	10,718.50	32,098	320,980
Thomas	2,509	80,288	115	488.75	1,165	11,650
Trego	6,902	220,864	876	3,723.00	3,570	35,700
Wabaunsee	28,564	914,048	3,344	14,212.00	23,025	230,250
Wallace	4,895	156,640	743	3,157.75	752	7,520
Washington	22,405	716,960	4,396	18,683.00	48,910	489,100
Wichita	3,898	124,736	2,356	10,013.00	475	4,750
Wilson	12,583	402,656	1,370	5,822.50	19,580	195,800
Woodson	10,435	333,920	1,341	5,699.25	11,216	112,160
Wyandotte	963	30,816	2,605	11,071.25	2,581	25,810

* Records of the State Tax Commission.

TABLE showing the number that have died of disease, the number of sheep killed by dogs and by wolves, and the number of dogs, for the year ending March 1, 1911.

COUNTIES.	Horses.	Mules and asses.	Milch cows.	Other cattle.	Sheep.	Swine.	Sheep killed by dogs.	Sheep killed by wolves.	Number of dogs.
The State	21,436	1,781	9,865	27,892	6,830	91,326	1,198	908	189,714
Allen	341	27	197	220	38	1,321	23	4	1,774
Anderson	256	17	143	231	66	829	....	21	1,860
Atchison	217	30	106	129	185	863	35	22	2,131
Barber	186	18	64	242	45	5,322	....	....	1,405
Barton	477	37	109	315	2	949	4	....	2,433
Bourbon	240	20	149	235	18	1,476	5	....	2,304
Brown	280	20	147	164	241	902	14	4	2,025
Butler	390	24	133	432	304	2,519	6	118	3,369
Chase	27	1	....	60	....	184	....	....	917
Chautauqua	229	27	111	323	4	320	9	1	1,820
Cherokee	447	40	200	361	84	447	22	84	2,565
Cheyenne	180	6	62	64	1	76	1	....	914
Clark	144	19	22	321	....	116	....	20	486
Clay	160	16	71	219	4	604	1	....	2,041
Cloud	196	17	89	238	126	5,005	....	....	2,285
Coffey	160	12	79	188	49	654	17	4	2,052
Comanche	73	4	19	125	....	554	1	11	558
Cowley	210	22	201	686	143	682	5	4	3,621
Crawford	430	39	325	300	113	1,081	38	4	3,487
Decatur	155	8	64	99	....	135	19	29	1,435
Dickinson	216	8	157	859	52	1,583	9	....	2,714
Doniphan	163	19	85	86	200	1,692	22	13	2,218
Douglas	200	23	168	153	236	851	20	12	2,676
Edwards	169	16	54	113	....	80	....	....	906
Elk	152	19	111	357	12	291	8	3	1,753
Ellis	407	2	82	371	2	831	....	....	2,042
Ellsworth	65	17	22	170	2	1,610	2	....	1,593
Finney	171	16	62	215	....	45	....	25	757
Ford	236	11	81	150	2	243	4	....	1,257

LIVE-STOCK STATISTICS, 1911—CONTINUED.

COUNTIES.	Horses.	Mules and asses.	Milch cows.	Other cattle.	Sheep.	Swine.	Sheep killed by dogs.	Sheep killed by wolves.	Number of dogs.
Franklin	185	10	137	211	32	460	27	13	2,128
Geary	49	4	28	205	....	315	4	....	1,090
Gove	159	10	39	58	3	156	....	5	922
Graham	331	19	110	265	7	904	10	26	1,740
Grant	8	....	2	54	....	....	....	....	256
Gray	101	7	39	66	2	34	....	....	507
Greeley	33	1	10	130	....	....	....	....	235
Greenwood	305	24	166	339	106	759	100	55	2,326
Hamilton	56	9	9	77	1,020	25	....	6	497
Harper	284	29	87	250	....	2,813	....	1	2,234
Harvey	206	10	100	417	48	1,478	99	2	2,016
Haskell	19	1	2	6	....	2	....	....	219
Hodgeman	48	9	21	244	....	38	7	3	666
Jackson	161	27	112	211	76	2,266	9	16	2,016
Jefferson	160	18	95	122	45	1,071	13	1	2,569
Jewell	365	34	139	588	10	6,259	1	23	3,119
Johnson	171	21	93	72	579	1,999	26	41	2,166
Kearny	93	5	25	109	....	7	....	....	539
Kingman	172	24	87	254	....	534	7	2	2,110
Kiowa	170	16	36	106	40	787	25	25	984
Labette	433	35	319	817	441	1,193	25	22	3,068
Lane	66	6	12	74	4	3	1	....	434
Leavenworth	178	19	149	184	53	772	4	32	2,057
Lincoln	192	10	74	485	1	168	1	....	1,713
Linn	249	25	110	163	172	1,736	68	....	2,178
Logan	69	5	12	50	50	17	40	....	716
Lyon	378	29	154	388	41	1,782	3	11	3,148
Marion	404	6	236	1,014	25	1,178	4	10	3,303
Marshall	369	31	165	1,012	....	772	2	....	3,380
McPherson	303	19	144	598	371	1,007	25	3	2,911
Meade	264	10	79	384	52	131	....	....	848
Miami	222	20	115	196	86	4,198	57	165	2,236
Mitchell	170	23	89	395	43	956	88	....	2,092
Montgomery	297	28	195	351	16	574	37	....	2,288
Morris	174	14	50	264	20	1,350	6	6	1,885
Morton	40	3	10	132	....	8	....	....	231
Nemaha	287	23	106	179	42	591	14	12	3,031
Neosho	431	13	233	492	101	908	15	7	2,684
Ness	129	1	47	229	11	32	4	2	920
Norton	192	23	145	308	6	280	8	....	1,575
Osage	174	12	94	232	140	613	18	1	2,341
Osborne	145	8	68	369	29	685	1	10	1,991
Ottawa	111	7	44	189	....	391	3	....	1,763
Pawnee	277	24	74	80	....	384	....	....	1,257
Phillips	233	14	131	327	45	454	4	....	2,638
Pottawatomie	201	17	184	508	73	2,911	21	....	2,467
Pratt	177	18	37	91	6	198	10	....	1,470
Rawlins	164	8	58	172	6	113	1	....	1,326
Reno	529	45	141	705	96	738	....	....	4,368
Republic	262	27	141	563	102	2,178	1	6	2,878
Rice	338	26	94	474	....	765	2	....	1,946
Riley	72	5	51	225	....	2,427	....	....	1,850
Rooks	106	5	63	181	76	205	....	....	1,930
Rush	281	19	120	367	....	174	....	....	1,803
Russell	344	24	168	476	7	248	1	....	1,866
Saline	133	13	64	259	4	560	....	....	2,143
Scott	75	13	24	73	....	25	....	....	442
Sedgwick	375	36	190	274	140	2,112	8	34	3,969
Seward	144	9	75	116	312	67	1	....	181
Shawnee	183	49	115	217	78	2,608	97	4	3,155
Sheridan	85	3	15	41	....	199	....	....	872
Sherman	96	10	17	37	....	130	....	4	697
Smith	307	17	137	407	4	804	....	10	2,838
Stafford	261	34	76	152	20	705	....	7	1,793
Stanton	23	4	2	68	5	....	7	....	209
Stevens	125	7	35	125	54	41	....	....	494
Sumner	301	34	133	171	99	680	10	7	3,456
Thomas	188	15	56	91	27	137	....	....	797
Trego	152	7	19	160	21	84	....	....	910
Wabaunsee	227	43	66	593	18	448	3	1	2,193
Wallace	49	4	32	20	....	14	....	....	464
Washington	250	19	123	571	32	803	4	1	3,561
Wichita	18	1	5	43	....	4	2	....	387
Wilson	283	33	165	391	4	375	9	....	2,485
Woodson	184	10	128	135	....	139	....	....	1,437
Wyandotte	63	5	26	64	....	79	....	....	957

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LIVE-STOCK STATISTICS—CONTINUED.

TABLE showing the number that have died of disease, the number of sheep killed by dogs and by wolves, and the number of dogs, for the year ending March 1, 1912.

COUNTIES.	Horses.	Mules and asses.	Milch cows.	Other cattle.	Sheep.	Swine.	Sheep killed by dogs.	Sheep killed by wolves.	Number of dogs.
The State	30,133	1,972	13,630	37,233	7,315	437,639	1,110	807	181,866
Allen	281	16	140	223	77	1,552	50	34	1,749
Anderson	222	16	142	166	51	2,376	19	1	2,042
Atchison	320	29	108	132	19	7,999	35	68	1,887
Barber	540	24	114	970	190	6,712	....	12	1,359
Barton	600	47	204	521	11	3,923	2	....	2,419
Bourbon	227	11	151	285	96	994	5	....	2,079
Brown	389	35	139	182	34	22,017	16	7	1,979
Butler	585	32	235	826	230	23,241	40	19	2,994
Chase	80	....	10	128	2	614	....	....	1,106
Chautauqua	197	10	145	385	3	1,048	1	....	1,600
Cherokee	399	40	210	282	261	2,629	13	12	2,435
Cheyenne	215	6	128	162	....	54	....	....	752
Clark	265	14	79	359	172	462	....	36	466
Clay	368	12	126	279	20	6,186	....	19	1,949
Cloud	304	22	103	275	17	2,663	....	....	2,496
Coffey	171	8	84	121	107	1,425	....	26	2,134
Comanche	146	11	56	417	....	3,784	150	....	658
Cowley	452	22	334	752	149	21,756	41	56	3,533
Crawford	335	39	159	210	179	3,313	12	....	2,971
Decatur	313	10	173	229	2	354	....	....	1,221
Dickinson	308	17	168	576	30	14,573	....	....	2,692
Doniphan	271	30	86	132	69	13,180	9	....	2,188
Douglas	229	14	119	183	571	5,571	17	25	2,779
Edwards	232	25	82	266	....	906	....	....	918
Elk	131	25	133	754	32	909	....	2	1,392
Ellis	654	13	245	820	....	1,013	....	....	2,071
Ellsworth	114	15	35	136	14	4,832	....	....	1,550
Finney	146	11	61	214	....	708	....	42	721
Ford	395	44	162	330	....	1,241	....	....	1,471
Franklin	100	16	84	86	106	1,260	....	....	2,261
Geary	95	5	30	281	....	3,443	3	2	1,141
Gove	362	16	214	323	10	459	....	5	728
Graham	172	10	118	132	....	....	....	....	1,567
Grant	12	....	4	41	....	9	....	1	157
Gray	171	12	127	453	20	122	2	....	403
Greeley	42	7	68	234	5	1	....	....	217
Greenwood	207	25	84	305	11	2,216	....	....	2,267
Hamilton	72	15	169	398	9	50	....	3	465
Harper	620	42	237	787	59	21,369	2	....	2,101
Harvey	389	26	137	521	835	6,452	5	3	1,831
Haskell	....	....	....	....	....	....	....	....	143
Hodgeman	20	6	35	178	....	21	....	....	599
Jackson	379	26	113	381	15	8,591	5	5	2,398
Jefferson	239	28	105	190	54	2,982	2	....	2,497
Jewell	565	34	179	499	15	18,459	13	2	2,761
Johnson	330	26	141	117	115	8,969	12	67	1,971
Kearny	66	6	40	89	202	22	....	....	458
Kingman	388	21	187	816	13	4,195	1	10	1,832
Kiowa	233	18	39	160	40	440	....	....	891
Labette	437	33	341	881	341	4,310	48	55	3,075
Lane	116	2	55	150	....	22	....	....	372
Leavenworth	243	16	99	113	27	4,196	22	75	2,187
Lincoln	208	9	85	460	....	1,463	....	....	1,709
Linn	162	12	85	120	129	2,149	16	44	2,100
Logan	93	5	55	95	....	14	....	33	622
Lyon	523	27	227	365	46	7,042	....	....	3,043
Marion	558	14	274	1,014	19	13,883	4	3	3,126
Marshall	699	34	253	745	3	2,019	2	....	3,249
McPherson	420	6	107	403	234	5,309	....	9	2,652
Meade	400	28	167	770	15	262	1	....	809
Miami	249	21	109	155	89	4,149	90	14	2,092
Mitchell	245	11	100	308	10	5,586	15	....	1,780
Montgomery	363	22	322	707	79	1,876	4	6	2,122
Morris	220	8	109	239	25	5,225	4	3	1,580
Morton	72	9	42	266	....	24	....	....	191
Nemaha	570	29	99	259	65	3,460	30	16	3,129
Neosho	263	23	164	315	112	677	5	9	2,329
Ness	60	....	26	159	....	31	....	....	661
Norton	249	12	183	356	24	1,196	2	9	1,425
Osage	233	15	120	114	72	2,096	9	5	2,235
Osborne	185	9	83	389	58	1,978	8	12	1,887
Ottawa	159	6	55	218	21	2,905	....	....	1,764
Pawnee	291	76	110	123	....	900	....	....	1,245

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LIVE STOCK STATISTICS, 1912—CONCLUDED.

COUNTIES.	Horses.	Mules and asses.	Milch cows.	Other Cattle.	Sheep.	Swine.	Sheep killed by dogs.	Sheep killed by wolves.	Number of dogs.
Phillips	413	19	338	716	8	3,952	....	....	2,362
Pottawatomie	265	20	113	471	86	3,548	2	....	2,523
Pratt	378	17	112	284	19	1,442	10	....	1,379
Rawlins	312	4	156	201	....	96	....	....	1,122
Reno	892	67	260	1,084	163	12,186	285	....	3,984
Republic	575	19	161	637	10	14,351	....	....	3,031
Rice	490	34	132	449	21	4,423	2	....	1,894
Riley	178	7	56	346	20	3,355	15	3	2,109
Rooks	365	20	203	352	....	586	....	....	1,764
Rush	402	15	156	501	8	358	2	....	1,675
Russell	440	22	249	591	427	664	....	....	1,907
Saline	215	8	98	245	53	11,198	14	....	1,809
Scott	124	6	35	122	10	29	....	....	437
Sedgwick	737	60	397	854	301	23,015	6	7	4,362
Seward	90	13	68	104	2	88	....	1	322
Shawnee	256	16	167	212	281	5,561	5	11	3,326
Sheridan	111	5	77	145	....	1,291	....	2	774
Sherman	51	5	35	60	....	17	....	....	526
Smith	375	24	218	780	1	10,321	13	4	2,772
Stafford	387	49	108	307	3	1,310	2	....	1,854
Stanton	5	....	....	....	....	....	....	....	169
Stevens	176	13	63	396	200	63	4	....	474
Sumner	710	42	227	705	72	16,742	....	8	3,515
Thomas	283	10	156	232	19	235	....	....	645
Trego	192	14	34	275	....	453	....	....	969
Wabaunsee	255	18	130	425	214	3,006	16	18	1,990
Wallace	86	9	54	210	....	58	6	....	293
Washington	538	27	201	911	161	10,767	13	3	3,327
Wichita	10	2	22	38	....	5	....	....	305
Wilson	225	20	146	302	1	1,655	....	....	2,442
Woodson	133	18	79	192	15	207	....	....	1,235
Wyandotte	95	5	67	56	6	890	....	....	887

PRODUCTS OF LIVE STOCK, 1911.

TABLE showing value of various products of live stock.

COUNTIES.	Animals slaughtered or sold for slaughter.	Poultry and eggs sold.	Wool clip, 1910.	
			Pounds.	Value.
The State	$82,105,615	$11,869,098	676,096	$114,936.82
Allen	$474,470	$133,880	8,248	$1,401.81
Anderson	782,147	181,891	4,107	698.19
Atchison	584,372	98,569	3,846	653.82
Barber	707,588	47,126	6,442	1,095.14
Barton	293,268	115,741	30	5.10
Bourbon	710,974	156,385	6,065	1,031.05
Brown	1,467,441	143,578	8,308	1,412.36
Butler	3,272,688	246,832	60,215	10,236.55
Chase	1,462,662	54,140	925	157.25
Chautauqua	743,114	76,009	200	34.00
Cherokee	279,864	106,846	6,308	1,072.36
Cheyenne	161,386	36,667	5,170	878.90
Clark	907,526	16,084	35,600	6,052.00
Clay	1,177,422	176,461	3,210	545.70
Cloud	783,817	171,609	3,400	578.00
Coffey	851,767	161,278	4,721	802.57
Comanche	504,862	24,923	350	59.50
Cowley	1,463,699	178,354	6,688	1,136.96
Crawford	622,083	155,504	11,247	1,911.99
Decatur	325,678	87,991	10,395	1,767.15
Dickinson	1,853,785	221,565	11,154	1,896.18
Doniphan	853,178	79,906	9,680	1,645.60
Douglas	706,991	137,152	7,873	1,338.41
Edwards	118,167	39,749	50	8.50
Elk	1,139,947	98,166	2,400	408.00
Ellis	283,834	73,445	6,211	1,055.87
Ellsworth	1,496,784	109,306	866	147.22
Finney	141,181	22,284	7,000	1,190.00
Ford	191,173	56,193	112	19.04

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PRODUCTS OF LIVE STOCK, 1911—CONCLUDED.

COUNTIES.	Animals slaughtered or sold for slaughter.	Poultry and eggs sold.	Wool clip, 1910.	
			Pounds.	Value.
Franklin	$969,251	$171,261	6,041	$1,026.97
Geary	549,489	59,877	1,539	261.63
Gove	142,194	40,455	1,700	289.00
Graham	641,915	86,991	30	5.10
Grant	35,520	2,561	5,100	867.00
Gray	40,603	18,213	....	....
Greeley	31,740	6,821	....	....
Greenwood	3,449,114	157,002	17,000	2,890.00
Hamilton	44,487	11,245	19,780	3,362.60
Harper	709,236	98,754	1,040	176.80
Harvey	777,107	133,433	10,243	1,741.31
Haskell	17,960	5,306	5,411	919.87
Hodgeman	174,233	27,945	7,575	1,287.75
Jackson	1,107,326	148,175	1,822	309.74
Jefferson	1,434,655	175,181	8,452	1,436.84
Jewell	2,394,100	315,450	9,272	1,576.24
Johnson	742,990	121,755	19,936	3,389.12
Kearny	41,856	10,535	5	.85
Kingman	853,565	84,315	20	3.40
Kiowa	351,247	28,358	1,700	289.00
Labette	726,393	179,539	16,659	2,832.03
Lane	46,016	26,705	2,780	472.60
Leavenworth	634,749	95,024	7,312	1,243.04
Lincoln	899,566	165,357	385	65.45
Linn	686,917	179,634	10,753	1,828.01
Logan	67,400	20,379	29,460	5,008.20
Lyon	1,751,611	212,901	1,533	260.61
Marion	1,753,256	216,368	3,641	618.97
Marshall	1,231,832	204,193	1,434	243.78
McPherson	1,400,738	219,935	2,549	433.33
Meade	170,330	26,667	2,748	467.16
Miami	1,184,212	158,405	12,079	2,053.43
Mitchell	1,217,016	197,711	5,000	850.00
Montgomery	460,437	135,276	1,660	282.20
Morris	1,596,293	106,165	1,715	291.55
Morton	20,935	2,062	....	....
Nemaha	1,759,898	222,380	8,605	1,462.85
Neosho	566,956	194,362	7,700	1,309.00
Ness	102,415	62,730	200	34.00
Norton	489,197	103,674	4,692	797.64
Osage	1,229,896	171,668	8,820	1,499.40
Osborne	910,723	152,654	4,040	686.80
Ottawa	1,313,644	115,039	380	64.60
Pawnee	238,615	60,957	50	8.50
Phillips	1,122,367	182,630	3,108	528.36
Pottawatomie	2,088,661	159,184	1,628	276.76
Pratt	245,325	64,860	8,460	1,438.20
Rawlins	178,417	56,515	25,528	4,339.76
Reno	1,089,246	232,223	5,010	851.70
Republic	1,693,961	216,780	5,120	870.40
Rice	1,074,983	128,998	132	22.44
Riley	1,838,416	146,941	....	....
Rooks	645,389	125,356	....	....
Rush	168,720	81,827	....	....
Russell	394,816	102,730	5,600	952.00
Saline	1,298,155	143,284	....	....
Scott	32,207	17,948	....	....
Sedgwick	1,448,199	202,186	4,650	790.50
Seward	52,287	7,887	2,130	362.10
Shawnee	628,841	116,731	3,825	650.25
Sheridan	214,981	45,489	8	1.36
Sherman	86,199	22,351	1,470	249.90
Smith	1,478,880	220,067	2,478	421.26
Stafford	402,965	73,076	600	102.00
Stanton	18,104	1,737	82,110	13,958.70
Stevens	64,067	6,410	....	....
Sumner	1,214,485	166,154	3,248	552.16
Thomas	153,981	29,065	200	34.00
Trego	231,129	42,282	22	3.74
Wabaunsee	2,276,982	139,998	8,042	1,367.14
Wallace	29,460	11,380	....	....
Washington	1,932,670	219,236	3,245	551.65
Wichita	12,123	12,828	16,540	2,811.80
Wilson	643,244	127,057	3,962	673.54
Woodson	438,090	98,280	6,003	1,020.51
Wyandotte	104,369	34,561	1,300	221.00

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PRODUCTS OF LIVE STOCK, 1912.

TABLE showing value of various products of live stock.

COUNTIES.	Animals slaughtered or sold for slaughter.	Poultry and eggs sold.	Wool clip, 1911.	
			Pounds.	Value.
The State	$72,898,207	$10,057,983	534,375	$106,875.00
Allen	$374,854	$124,447	8,749	$1,749.80
Anderson	726,112	133,177	5,071	1,014.20
Atchison	658,698	155,922	1,830	366.00
Barber	593,790	52,401	21,950	4,390.00
Barton	346,608	103,956	15	3.00
Bourbon	646,355	144,556	7,149	1,429.80
Brown	1,123,836	130,877	11,893	2,378.60
Butler	2,792,021	222,026	43,100	8,620.00
Chase	1,567,432	61,212	20	4.00
Chautauqua	848,955	69,027	780	156.00
Cherokee	268,855	100,008	6,325	1,265.00
Cheyenne	81,546	26,357	....	....
Clark	590,029	21,024	34,000	6,800.00
Clay	1,018,209	151,532	2,260	452.00
Cloud	850,069	165,265	320	64.00
Coffey	908,596	165,593	7,750	1,550.00
Comanche	308,335	22,143	18,000	3,600.00
Cowley	1,189,169	172,640	7,961	1,592.20
Crawford	504,052	130,751	7,647	1,529.40
Decatur	249,054	60,753	2,480	496.00
Dickinson	1,248,429	197,319	6,686	1,337.20
Doniphan	844,141	88,696	4,135	827.00
Douglas	546,469	102,373	11,030	2,206.00
Edwards	146,679	40,281	....	....
Elk	857,483	84,737	....	....
Ellis	248,631	54,951	7,000	1,400.00
Ellsworth	1,099,264	92,772	300	60.00
Finney	96,939	16,944	5,300	1,060.00
Ford	197,395	65,276	....	....
Franklin	1,140,759	163,178	5,138	1,027.60
Geary	668,394	61,849	975	195.00
Gove	96,190	26,277	....	....
Graham	288,814	54,834	....	....
Grant	48,443	1,259	4,800	960.00
Gray	40,060	13,320	7,900	1,580.00
Greeley	15,982	2,987	....	....
Greenwood	3,281,540	154,476	8,110	1,622.00
Hamilton	82,311	7,882	22,015	4,403.00
Harper	392,522	95,048	3,368	673.60
Harvey	575,939	118,754	7,635	1,527.00
Haskell	16,86	3,010	5,600	1,120.00
Hodgeman	156,285	20,283	7,000	1,400.00
Jackson	1,033,896	142,046	2,145	429.00
Jefferson	1,277,537	161,884	12,724	2,544.80
Jewell	1,887,199	287,877	3,720	744.00
Johnson	545,455	107,001	13,832	2,766.40
Kearny	19,082	6,975	250	50.00
Kingman	600,286	80,525	356	71.20
Kiowa	296,271	28,558	....	....
Labette	737,907	166,989	14,999	2,999.80
Lane	39,841	18,137	100	20.00
Leavenworth	497,256	81,740	7,941	1,588.20
Lincoln	849,914	127,949	100	20.00
Linn	485,513	138,736	19,803	3,960.60
Logan	45,692	11,681	13,800	2,760.00
Lyon	1,932,761	200,187	7,767	1,553.40
Marion	2,163,361	197,961	1,682	336.40
Marshall	1,204,115	181,728	1,299	259.80
McPherson	1,170,473	193,393	10,148	2,029.60
Meade	205,960	24,103	500	100.00
Miami	837,186	174,591	13,428	2,685.60
Mitchell	1,029,115	161,446	8,750	1,750.00
Montgomery	369,426	111,140	1,131	226.20
Morris	1,468,284	94,531	4,800	960.00
Morton	35,297	1,458	....	....
Nemaha	1,823,212	197,346	6,237	1,247.40
Neosho	467,577	166,284	5,991	1,198.20
Ness	63,164	36,240	....	....
Norton	267,087	72,555	1,193	238.60
Osage	1,043,869	154,705	5,890	1,178.00
Osborne	592,855	112,417	1,150	230.00
Ottawa	1,363,415	103,125	50	10.00
Pawnee	188,878	55,058	....	....

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PRODUCTS OF LIVE STOCK, 1912—CONCLUDED.

COUNTIES.	Animals slaughtered or sold for slaughter.	Poultry and eggs sold.	Wool clip, 1911.	
			Pounds.	Value.
Phillips	$637,461	$130,311	685	$137.00
Pottawatomie	1,697,708	142,778	1,160	232.00
Pratt	212,357	56,648	6,000	1,200.00
Rawlins	131,792	37,294	67	13.40
Reno	1,038,644	178,805	3,037	607.40
Republic	1,537,048	208,649	5,608	1,121.60
Rice	1,006,898	107,434	70	14.00
Riley	1,466,069	122,683	510	102.00
Rooks	393,896	86,032	100	20.00
Rush	95,518	66,667	25	5.00
Russell	279,398	83,681	5,100	1,020.00
Saline	1,272,827	135,574	60	12.00
Scott	18,246	10.600	85	17.00
Sedgwick	1,135,785	191.427	2,898	579.60
Seward	61,727	9.195	10,000	2,000.00
Shawnee	606,077	106,874	5,436	1,087.20
Sheridan	120,536	30,730	1,225	245.00
Sherman	70,115	15,258	5	1.00
Smith	1,451,991	186,139	1,288	257.60
Stafford	255,730	68,180	1,100	220.00
Stanton	10,031	1,862	....	....
Stevens	65,556	6,381	....	....
Sumner	916,831	176,335	1,507	301.40
Thomas	98,201	15,553	....	....
Trego	180,988	32,304	4,558	911.60
Wabaunsee	2,572,636	129,731	8,065	1,613.00
Wallace	20,911	8,972	....	....
Washington	1,714,845	197,889	1,255	251.00
Wichita	12,164	9,412	12,500	2,500.00
Wilson	535,772	119,863	3,205	641.00
Woodson	429,469	80,339	4,448	889.60
Wyandotte	72,991	25,844	300	60.00

DAIRY PRODUCTS, 1911.

TABLE showing the number of pounds and value of cheese and butter made in families and factories, and the value of milk sold.

COUNTIES.	Cheese.		Butter.		Milk sold for butter and cheese.	Milk sold other than for butter and cheese.
	Pounds.	Value.	Pounds.	Value.		
The State	50,054	$7,061.48	41,713.094	$11,189,065.62	$5,412,442	$1,274.626
Allen	70	$9.10	485,438	$125,505.12	$24,820	$13,770
Anderson	....	....	266.119	68,466.12	77,285	5,445
Atchison	....	....	730,412	206,844.00	50,668	31,156
Barber	35	4.55	137,503	33,000.72	9,095	2,831
Barton	....	....	1,111,181	321,715.44	37,058	18,689
Bourbon	700	91.00	611,172	161,321.28	65,427	17,075
Brown	6	78	242,840	58,281.60	84,860	22,432
Butler	3,229	419.77	454,836	109,160.64	65,624	10,354
Chase	....	....	99,890	23,973.60	13,829	455
Chautauqua	....	....	220,648	52,955.52	18,384	23,601
Cherokee	....	....	436,573	104,777.52	40,419	8,333
Cheyenne	....	....	73,312	17,594.88	11,658	3,905
Clark	50	6.50	54,230	13,015.20	3,280	1,562
Clay	1,125	146.25	328,228	78,774.72	63,228	3,976
Cloud	100	13.00	1,637,156	472,539.90	65,395	17,336
Coffey	213	27.69	433,598	115,995.84	87,968	4,576
Comanche	....	....	65,031	15,607.44	1,816	4,265
Cowley	....	....	2,812,213	817,639.62	126,746	16,988
Crawford	457	59.41	618,045	167,039.34	43.957	23,468
Decatur	....	....	146,020	35,044.80	44,490	3,457
Dickinson	....	....	2,541,435	750,607.32	192,059	20,061
Doniphan	1,775	230.75	188,727	45,294.48	35,159	1,683
Douglas	1,700	221.00	381,967	92,752.08	45,634	52,650
Edwards	....	....	105,559	25,334.16	13,191	5,323
Elk	....	....	157,851	37,884.24	79,894	4,637
Ellis	1,585	206.05	123,375	29,610.00	49,458	2,050
Ellsworth	1,990	258.70	192,132	46,111.68	45,192	12,975
Finney	....	....	92,906	22,297.44	9,613	5,754
Ford	25	3.25	123,275	29,586.00	31,551	16,102

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DAIRY PRODUCTS, 1911—CONCLUDED.

COUNTIES.	Cheese.		Butter.		Milk sold for butter and cheese.	Milk sold other than for butter and cheese.
	Pounds.	Value.	Pounds.	Value.		
Franklin			666,152	$186,351.06	$120,798	$5,801
Geary			515,080	145,219.20	28,077	9,498
Gove	80	$10.40	84,051	20,172.24	15,520	798
Graham	50	6.50	195,895	47,014.80	23,038	4,739
Grant			21,519	5,164.56	740	39
Gray			36,496	8,759.04	385	13,621
Greeley			20,412	4,898.88	14,431	696
Greenwood	75	9.75	266,903	64,056.72	53,437	6,121
Hamilton			39,925	9,582.00	15,361	6,297
Harper	172	22.36	388,613	104,127.12	32,412	5,309
Harvey	600	78.00	598,618	162,484.98	67,106	20,781
Haskell			16,205	3,889.20	7,268	6
Hodgeman			47,100	11,304.00	50,481	315
Jackson	152	19.76	230,004	55,200.96	83,391	7,114
Jefferson	18,482	2,957.12	251,354	60,324.96	116,272	7,415
Jewell	3	.39	452,692	108,646.08	121,279	5,691
Johnson	500	65.00	346,436	85,549.68	51,502	103,035
Kearny	35	4.55	42,199	10,127.76	5,391	2,277
Kingman			220,160	53,198.40	55,982	3,279
Kiowa			106,059	25,454.16	8,232	4,259
Labette	3,400	442.00	682,088	175,701.12	67,768	38,286
Lane			56,712	13,610.88	18,280	1,015
Leavenworth			193,997	46,559.28	163,763	24,158
Lincoln			212,425	50,982.00	61,587	5,148
Linn	20	2.60	270,963	65,031.12	32,084	7,148
Logan			60,493	14,518.32	16,942	7,550
Lyon	50	6.50	382,962	91,910.88	65,972	35,206
Marion	20	2.60	516,231	140,013 00	116,860	4,445
Marshall	2,728	354.64	384,351	92,244.24	76,049	21,846
McPherson	1,000	130.00	319,827	76,758.48	103,680	16,375
Meade	220	28.60	108,414	26,019.36	5,424	879
Miami			391,631	96,415.02	37,613	5,200
Mitchell	5	65	283,510	68,042.40	26,524	9,468
Montgomery			492,072	118,097.28	39,828	10,989
Morris	100	13.00	717,109	203,186.16	75,045	7,476
Morton			17,002	4,080.48	139	58
Nemaha	75	9.75	302,393	72,574.32	128,017	3,266
Neosho	299	38.87	340,793	84,932.22	79,453	23,307
Ness	40	5.20	74,582	17,899.68	67,218	185
Norton			205,018	49,204.32	54,521	25,699
Osage	20	2.60	426,227	111,813.00	101,892	18,697
Osborne	300	39.00	247,650	59,436.00	102,775	3,981
Ottawa	1,092	141.96	216,611	51,986.64	53,131	8,581
Pawnee	150	19.50	152,995	36,718.80	15,288	3,266
Phillips	65	8.45	340,186	81,644.64	106,449	5,751
Pottawatomie	213	27.69	286,978	68,874.72	47,568	7,152
Pratt			195,488	46,917.12	10,624	7,601
Rawlins	550	71.50	98,217	23,572.08	16,836	1,118
Reno	1,030	133.90	2,099,867	599,968.08	67,313	51,021
Republic			424,644	109,365.00	89,350	5,569
Rice			271,988	65,277.12	30,492	11,009
Riley	131	17.03	290,507	69,721 68	30,228	10,335
Rooks			199,834	47,960.16	71,270	1,463
Rush	745	96.85	90,548	21,731.52	47,419	1,825
Russell			163,715	39,291.60	52,654	1,856
Saline	535	69.55	1,132,788	325,944 96	75,389	7,080
Scott			38,799	9,311.76	11,288	4,127
Sedgwick	1,775	230.75	1,265,018	345,061.32	59,475	120,213
Seward	325	42.25	47,295	11,350.80	9,088	5,622
Shawnee			5,257,117	1,558,320.60	165,062	21,377
Sheridan			84,129	20,190.96	27,156	1,049
Sherman	750	97.50	68,732	16,495.68	34,898	7,790
Smith			321,004	77,040.96	117,375	5,809
Stafford			306,371	73,529.04	11,430	2,970
Stanton	390	50.70	16,212	3,890.88	47	
Stevens	50	6.50	39,995	9,598.80	2,160	50
Sumner			436,621	104,789.04	70,591	20,930
Thomas			75,316	18,075.84	28,695	125
Trego			76,640	18,393.60	35,017	660
Wabaunsee			203,326	48,798.24	56,778	5,697
Wallace	267	34.71	39,067	9,376.08	18,641	2,343
Washington			349,950	83,988.00	143,754	7,374
Wichita	25	3.25	37,086	8,900.64	12,594	898
Wilson	150	19 50	369,346	88,643.04	14,558	2,436
Woodson	325	42.25	215,436	51,704.64	11,109	5,835
Wyandotte			397,273	113,345.52	118,420	103,312

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DAIRY PRODUCTS, 1912.

TABLE showing the number of pounds and value of cheese and butter made in families and factories, and the value of milk sold.

COUNTIES.	Cheese.		Butter.		Milk sold for butter and cheese.	Milk sold other than for butter and cheese.
	Pounds.	Value.	Pounds.	Value.		
The State	53,792	$8,270.88	43,626,709	$11,831,475.25	$5,198,262	$1,854,302
Allen	....	....	465,928	$123,522.00	$26,604	$15,985
Anderson	100	$14.00	234,275	60,488.75	66,998	11,936
Atchison	956	133.84	697,433	194,358.25	40,500	31,618
Barber	140	19.60	141,592	35,398.00	14,045	4,234
Barton	55	7.70	1,098,327	311,381.75	42,571	13,119
Bourbon	....	....	564,298	150,378.09	53,102	24,767
Brown	....	....	266,845	66,711.25	84,345	13,381
Butler	330	46.20	417,024	104,256.00	80,975	6,117
Chase	....	....	86,544	21,636.00	12,418	783
Chautauqua	....	....	178,649	44,662.25	36,027	2,929
Cherokee	....	....	415,665	103,916.25	40,064	19,472
Cheyenne	....	....	57,446	14,361.50	18,943	346
Clark	39	5.46	51,288	12,822.00	2,240	1,775
Clay	222	31.08	318,188	79,547.00	69,303	4,977
Cloud	2,350	329.00	2,348,293	667,078.25	69,710	12,252
Coffey	165	23.10	450,414	120,603.50	65,211	4,857
Comanche	100	14.00	64,203	16,050.75	1,785	3,628
Cowley	....	....	2,367,720	670,202.60	119,537	16,016
Crawford	1,270	177.80	620,520	166,268.24	81,342	22,570
Decatur	180	25.20	119,824	29,956.00	34,538	3,695
Dickinson	20	2.80	2,278,657	650,639.05	228,695	18,655
Doniphan	....	....	173,779	43,444.75	26,300	9,961
Douglas	....	....	387,279	98,259.75	52,248	42,660
Edwards	100	14.00	110,697	27,674.25	8,652	12,750
Elk	15	2.10	146,152	36,588.00	55,439	15,852
Ellis	680	95.20	117,102	29,275.50	29,478	3,858
Ellsworth	25	3.50	174,173	43,548.25	37,220	11,912
Finney	700	98.00	89,340	22,335.00	15,018	4,321
Ford	....	....	125,090	31,272.50	26,693	29,138
Franklin	....	....	521,538	144,116.54	93,935	26,829
Geary	30	4.20	732,898	206,647.62	33,005	11,441
Gove	545	76.30	59,257	14,814.25	13,518	1,718
Graham	....	....	184,392	46,098.00	22,058	3,045
Grant	....	....	13,802	3,450.50	4,217	27
Gray	....	....	31,248	7,812.00	13,125	25
Greeley	....	....	12,677	3,169.25	7,188	4,628
Greenwood	25	3.50	255,579	63,894.75	43,955	12,045
Hamilton	....	....	35,745	8,936.25	15,057	3,891
Harper	352	49.28	618,494	170,623.50	35,496	8,497
Harvey	872	122.08	617,489	167,734.57	66,155	14,414
Haskell	....	....	8,380	2,095.00	8,586	....
Hodgeman	....	....	43,107	10,776.75	47,013	440
Jackson	60	8.40	250,851	62,712.75	90,365	7,098
Jefferson	18,500	3,330.00	229,474	57,368.50	113,127	1,762
Jewell	....	....	417,145	104,286.25	120,406	15,442
Johnson	1,500	210.00	314,506	79,126.50	44,023	102,695
Kearny	100	14.00	35,405	8,851 25	7,155	1,603
Kingman	....	....	203,243	51,210.75	65,131	8,189
Kiowa	....	....	96,513	24,128.25	2,277	2,183
Labette	2,455	343.70	582,082	152,675.50	94,289	44,167
Lane	....	....	41,950	10,487.50	21,122	855
Leavenworth	....	....	193,948	49,087.00	121,082	18,780
Lincoln	....	....	199,951	49,987.75	53,470	1,285
Linn	....	....	254,379	63,594.75	30,337	7,782
Logan	....	....	42,412	10,603.00	20,189	1,997
Lyon	....	....	415,203	103,800.75	68,894	34,386
Marion	24	3.36	661,260	182,629.44	113,810	3,523
Marshall	3,296	461.44	370,977	92,744.25	90,610	18,099
McPherson	1,080	151.20	286,940	71,735.00	92,457	16,965
Meade	....	....	86,586	21,646.50	9,231	2,020
Miami	....	....	373,678	95,078.34	38,920	9,032
Mitchell	....	....	247,390	61,847.50	31,892	1,712
Montgomery	....	....	476,940	122,595.00	52,751	8,485
Morris	....	....	580,194	160,848.50	58,220	6,783
Morton	15	2.10	15,255	3,813.75	805	470
Nemaha	2,185	305.90	281,061	70,265.25	128,829	12,969
Neosho	....	....	267,568	67,872.00	58,782	26,176
Ness	806	112.84	66,675	16,668.75	40,021	....
Norton	4	.56	193,440	48,360.00	69,182	3,844
Osage	100	14.00	264,767	69,087.43	89,637	14,797
Osborne	400	56.00	219,360	54,840.00	95,476	5,388
Ottawa	12	1.68	217,747	54,436.75	59,780	5,706
Pawnee	....	....	151,620	37,905.00	9,423	4,924

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DAIRY PRODUCTS, 1912—CONCLUDED.

COUNTIES.	Cheese.		Butter.		Milk sold for butter and cheese.	Milk sold other than for butter and cheese.
	Pounds.	Value.	Pounds.	Value.		
Phillips	....	....	242,483	$60.620.75	$100,825	$3,521
Pottawatomie	300	$42.00	247,704	61,926.00	46,049	9,523
Pratt	....	....	183,541	45,885.25	10,409	4,005
Rawlins	220	30.80	78,067	19,516.75	8,024	5,703
Reno	1,720	240.80	2,502,604	706,906.88	118,072	18,758
Republic	250	35.00	510,174	136,336.38	87,971	5,541
Rice	....	....	268,514	67,128.50	42,426	3,223
Riley	264	36.96	232,761	58,190.25	31,953	22,458
Rooks	....	....	159,755	39,938.75	71,779	2,705
Rush	955	133.70	81,415	20,353.75	46,513	1,493
Russell	....	....	156,725	39,181.25	44,167	2,302
Saline	594	83.16	942,622	263,499.26	53,878	24,382
Scott	306	42.84	25.983	6,495.75	9,855	4,001
Sedgwick	3,851	539.14	1,282,944	350,736.00	86,309	161,839
Seward	260	36.40	41.948	10,487.00	10,557	590
Shawnee	1.104	154.56	8,257,373	2,383,736.81	113,989	77,744
Sheridan	....	....	67,929	16,982.25	23,998	439
Sherman	....	....	78.003	19,500.75	33,034	5,025
Smith	....	....	338,617	84,654.25	110,348	5,790
Stafford	....	....	222,913	55,728.25	9,575	5,424
Stanton	460	64.40	9,921	2,480.25	1,093	....
Stevens	....	....	41,870	10,467.50	2,740	....
Sumner	....	....	429,866	107,466.50	112,560	12,985
Thomas	....	....	51,642	12,910.50	23,507	745
Trego	....	....	68,201	17,050.25	27,247	10
Wabaunsee	715	100.10	188,173	47,043.25	54,684	7,544
Wallace	250	35.00	35,057	8,764.25	9,076	6,475
Washington	....	....	355,995	88,998.75	152,337	6,792
Wichita	50	7.00	23,616	5,904.00	13,224	424
Wilson	1,985	277.90	366,087	91.521.75	18,138	3,349
Woodson	700	98.00	192,541	48,135.25	13,668	7,517
Wyandotte	....	....	206,799	55,899.75	30,760	109,347

WOOD MARKETED.

TABLE showing value of wood marketed for the years 1911 and 1912.

COUNTIES.	1911.	1912.	COUNTIES.	1911.	1912.
The State	$80.518	$72,245	Franklin	$295	$576
			Geary	6,014	2,269
Allen	$794	$2,996	Gove	....	....
Anderson	729	868	Graham	446	....
Atchison	1,921	2,222	Grant	....	....
Barber	250	320	Gray	....	855
Barton	15	....	Greeley	....	....
Bourbon	1,808	2,195	Greenwood	737	741
Brown	2,039	1,158	Hamilton	....	....
Butler	270	6,511	Harper	75	28
Chase	150	2,419	Harvey	604	64
Chautauqua	119	282	Haskell	528	....
Cherokee	8,279	1,408	Hodgeman	....	....
Cheyenne	800	....	Jackson	1,481	1,608
Clark	....	....	Jefferson	4,270	2,884
Clay	859	407	Jewell	914	682
Cloud	....	325	Johnson	978	1,414
Coffey	2,209	516	Kearny	....	....
Comanche	150	2.623	Kingman	239	222
Cowley	708	681	Kiowa	175	....
Crawford	2,335	1,409	Labette	1,757	2,164
Decatur	272	80	Lane	....	....
Dickinson	1,460	951	Leavenworth	727	1,152
Doniphan	2,096	2,098	Lincoln	80	50
Douglas	1,203	363	Linn	535	1,269
Edwards	6	....	Logan	35	40
Elk	395	....	Lyon	70	995
Ellis	9	....	Marion	135	188
Ellsworth	533	25	Marshall	4,486	1,173
Finney	....	....	McPherson	146	260
Ford	....	....	Meade	....	....

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WOOD MARKETED — CONCLUDED.

COUNTIES.	1911.	1912.	COUNTIES.	1911.	1912.
Miami	$2,325	$1,556	Russell	....	$90
Mitchell	1,290	162	Saline	....	30
Montgomery	767	170	Scott	....	....
Morris	355	1,035	Sedgwick	$589	269
Morton	....	....	Seward	....	....
Nemaha	3,249	3,308	Shawnee	1,579	1,062
Neosho	659	429	Sheridan	25	....
Ness	28	....	Sherman	355	....
Norton	610	459	Smith	231	125
Osage	705	474	Stafford	....	10
Osborne	386	1,343	Stanton	....	....
Ottawa	170	259	Stevens	....	....
Pawnee	....	78	Sumner	280	139
Phillips	745	291	Thomas	100	....
Pottawatomie	831	2,071	Trego	250	661
Pratt	200	....	Wabaunsee	2,428	1,428
Rawlins	25	....	Wallace	....	....
Reno	492	1,104	Washington	1,550	1,432
Republic	231	178	Wichita	....	1,450
Rice	30	85	Wilson	120	58
Riley	3,528	2,912	Woodson	1,374	355
Rooks	425	525	Wyandotte	450	384
Rush	....	22			

APICULTURE, 1911.

TABLE showing number of stands of bees, pounds and value of honey and wax produced.

COUNTIES.	Stands of bees.	Honey.		Beeswax.	
		Pounds.	Value.	Pounds.	Value.
The State	74.160	947.888	$142,183.20	9,126	$2,281.50
Allen	662	3,726	$558 90	16	$4.00
Anderson	690	2,462	369.30	5	1.25
Atchison	1,880	12,632	1,894.80	750	187.50
Barber	180	3,720	558.00	....	....
Barton	256	4,976	746.40	70	17.50
Bourbon	1,086	6,074	911.10	14	3.50
Brown	1,178	15,254	2,288.10	26	6.50
Butler	2,130	51,968	7,795 20	100	25.00
Chase	617	11,463	1,719.45	....	....
Chautauqua	308	2,407	361.05	....	....
Cherokee	1,064	7,833	1,174.95	92	23.00
Cheyenne	7	65	9.75	10	2.50
Clark	1	....	....	....	....
Clay	604	7,774	1,166.10	96	24.00
Cloud	943	16,077	2,411.55	11	2.75
Coffey	1,100	8,793	1,318.95	7	1.75
Comanche	8	....	....	....	....
Cowley	1,221	16,413	2,461.95	20	5.00
Crawford	851	4,936	740.40	20	5.00
Decatur	538	5,263	789.45	....	....
Dickinson	1,523	20,987	3,148.05	187	46.75
Doniphan	1,122	14,464	2,169.60	117	29.25
Douglas	1,207	11,776	1,766.40	22	5.50
Edwards	....	....	....	....	....
Elk	491	2,423	363.45	17	4.25
Ellis	....	....	....	....	....
Ellsworth	35	400	60.00	....	....
Finney	287	18,566	2,784.90	300	75.00
Ford	308	2,510	376.50	25	6.25

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APICULTURE, 1911—CONCLUDED.

COUNTIES.	Stands of bees.	Honey.		Beeswax.	
		Pounds.	Value.	Pounds.	Value.
Franklin	1,607	10,050	$1,507.50	145	$36.25
Geary	320	3,094	464.10	15	3.75
Gove	....	....	....	....	....
Graham	20	30	4.50	....	....
Grant	....	....	....	....	....
Gray	73	745	111.75	....	....
Greeley	....	....	....	....	....
Greenwood	561	6,109	916.35	162	40.50
Hamilton	50	1,912	286.80	2	.50
Harper	61	852	127.80	....	....
Harvey	919	14,597	2,189.55	309	77.25
Haskell	....	....	....	....	....
Hodgeman	....	....	....	....	....
Jackson	1,551	14,861	2,229.15	9	2.25
Jefferson	1,681	19,447	2,917.05	146	36.50
Jewell	4,398	60,091	9,013.65	1,303	325.75
Johnson	1,472	11,609	1,741.35	190	47.50
Kearny	78	1,600	240.00	....	....
Kingman	61	745	111.75	7	1.75
Kiowa	....	....	....	....	....
Labette	1,581	7,217	1,082.55	....	....
Lane	3	60	9.00	....	....
Leavenworth	1,155	12,822	1,923.30	188	47.00
Lincoln	170	1,585	237.75	16	4.00
Linn	1,065	7,454	1,118.10	152	38.00
Logan	....	....	....	....	....
Lyon	1,292	11,392	1,708.80	183	45.75
Marion	740	10,054	1,508.10	23	5.75
Marshall	1,961	32,055	4,808.25	183	45.75
McPherson	1,129	23,669	3,550.35	148	37.00
Meade	19	120	18.00	....	....
Miami	1,732	6,401	960.15	139	34.75
Mitchell	1,126	16,781	2,517.15	100	25.00
Montgomery	511	1,352	202.80	....	....
Morris	569	7,963	1,194.45	10	2.50
Morton	....	....	....	....	....
Nemaha	2,186	44,591	6,688.65	942	235.75
Neosho	932	8,052	1,207.80	38	9.50
Ness	5	30	4.50	....	....
Norton	409	1,889	283.35	....	....
Osage	1,637	8,553	1,282.95	190	47.50
Osborne	944	20,127	3,019.05	90	22.50
Ottawa	358	4,495	674.25	170	42.50
Pawnee	14	450	67.50	....	....
Phillips	833	9,028	1,354.20	245	61.25
Pottawatomie	951	5,259	788.85	128	32.00
Pratt	54	1,125	168.75	....	....
Rawlins	214	2,301	345.15	....	....
Reno	1,565	16,651	2,497.65	90	22.50
Republic	3,485	64,736	9,710.40	75	18.75
Rice	732	17,737	2,660.55	30	7.50
Riley	1,073	11,086	1,662.90	229	57.25
Rooks	137	3,715	557.25	11	2.75
Rush	2	30	4.50	....	....
Russell	60	1,042	156.30	....	....
Saline	687	11,057	1,658.55	96	24.00
Scott	....	....	....	....	....
Sedgwick	1,596	38,038	5,705.70	47	11.75
Seward	....	....	....	....	....
Shawnee	695	4,759	713.85	80	20.00
Sheridan	....	....	....	....	....
Sherman	3	....	....	100	25.00
Smith	2,927	45,863	6,879.45	10	2.50
Stafford	78	995	149.25	....	....
Stanton	....	....	....	....	....
Stevens	....	....	....	....	....
Sumner	1,357	23,252	3,487.80	194	48.50
Thomas	1	96	14.40	9	2.25
Trego	7	50	7.50	....	....
Wabaunsee	1,043	8,141	1,221.15	13	3.25
Wallace	24	632	94.80	....	....
Washington	1,944	43,738	6,560.70	304	76.00
Wichita	10	....	....	....	....
Wilson	1,148	6,671	1,000.65	470	117.50
Woodson	613	3,457	518.55	64	16.00
Wyandotte	234	2,613	391.95	165	41.25

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APICULTURE, 1912.

TABLE showing number of stands of bees, pounds and value of honey and wax produced.

COUNTIES.	Stands of bees.	Honey.		Beeswax.	
		Pounds.	Value.	Pounds.	Value.
The State	40,979	311,546	$46,731.90	11,119	$2,779.75
Allen	497	1,098	$164.70	56	$14.00
Anderson	586	1,963	294.45	5	1.25
Atchison	986	4,679	701.85	1,420	355.00
Barber	198	2,718	407.70	....	....
Barton	191	1,111	166.65	20	5.00
Bourbon	755	5,677	851.55	....	....
Brown	928	10,550	1,582.50	5	1.25
Butler	1,845	17,988	2,698.20	3,270	817.50
Chase	504	6,113	916.95	....	....
Chautauqua	173	816	122.40	....	....
Cherokee	295	505	75.75	....	....
Cheyenne	2	50	7.50	....	....
Clark	....	....	....	....	....
Clay	306	807	121.05	....	....
Cloud	505	3,691	553.65	51	12.75
Coffey	590	3,289	493.35	177	44.25
Comanche	8	50	7.50	....	....
Cowley	894	6,270	940.50	10	2.50
Crawford	468	3,803	570.45	16	4.00
Decatur	319	2,367	355.05	....	....
Dickinson	1,014	5,609	841.35	353	88.25
Doniphan	938	13,762	2,064.30	60	15.00
Douglas	712	2,971	445.65	2	.50
Edwards	1	20	3.00	....	....
Elk	138	792	118.80	....	....
Ellis	....	....	....	....	....
Ellsworth	18	....	....	....	....
Finney	196	13,340	2,001.00	250	62.50
Ford	293	7,329	1,099.35	333	83.25
Franklin	759	3,248	487.20	60	15.00
Geary	214	1,206	180.90	....	....
Gove	....	....	....	....	....
Graham	25	....	....	....	....
Grant	....	....	....	....	....
Gray	83	1,170	175.50	20	5.00
Greeley	....	....	....	....	....
Greenwood	242	2,532	379.80	5	1.25
Hamilton	52	845	126.75	....	....
Harper	48	665	99.75	....	....
Harvey	496	4,926	738.90	32	8.00
Haskell	....	....	....	....	....
Hodgeman	1	10	1.50	....	....
Jackson	865	3,883	582.45	127	31.75
Jefferson	787	1,242	186.30	40	10.00
Jewell	1,114	8,167	1,225.05	110	27.50
Johnson	550	4,370	655.50	....	....
Kearny	79	3,850	577.50	100	25.00
Kingman	28	160	24.00	....	....
Kiowa	....	....	....	....	....
Labette	449	1,705	255.75	....	....
Lane	....	....	....	....	....
Leavenworth	595	1,382	207.30	300	75.00
Lincoln	102	1,268	190.20	2	.50
Linn	1,028	7,957	1,193.55	581	145.25
Logan	....	....	....	....	....
Lyon	707	4,223	633.45	110	27.50
Marion	453	2,462	369.30	745	186.25
Marshall	601	908	136.20	77	19.25
McPherson	504	1,775	266.25	40	10.00
Meade	9	220	33.00	....	....
Miami	1,155	4,523	678.45	121	30.25
Mitchell	624	3,840	576.00	....	....
Montgomery	257	560	84.00	....	....
Morris	303	1,517	227.55	....	....
Morton	....	....	....	....	....
Nemaha	1,212	12,433	1,864.95	190	47.50
Neosho	443	2,008	301.20	112	28.00
Ness	....	....	....	....	....
Norton	225	2,615	392.25	....	....
Osage	483	3,494	524.10	83	20.75
Osborne	424	2,332	349.80	10	2.50
Ottawa	270	2,052	307.80	6	1.50
Pawnee	....	....	....	....	....

APICULTURE, 1912—CONCLUDED.

COUNTIES.	Stands of bees.	Honey.		Beeswax.	
		Pounds.	Value.	Pounds.	Value.
Phillips	308	1,791	$268.65		
Pottawatomie	586	3,623	543.45	63	$15.75
Pratt	11	70	10.50		
Rawlins	104	2,760	414.00	50	12.50
Reno	613	6,949	1,042.35	420	105.00
Republic	1,858	8,201	1,230.15		
Rice	331	5,417	812.55	10	2.50
Riley	765	4,972	745.80	220	55.00
Rooks	105	1,395	209.25		
Rush	3	30	4.50		
Russell	40	1,450	217.50	10	2.50
Saline	510	7,017	1,052.55	785	196.25
Scott	3	100	15.00		
Sedgwick	1,640	11,951	1,792.65	100	25.00
Seward					
Shawnee	535	4,462	669.30	73	18.25
Sheridan	9				
Sherman					
Smith	1,170	8,071	1,210.65	55	13.75
Stafford	98	1,745	261.75	5	1.25
Stanton					
Stevens					
Sumner	1,213	17,441	2,616.15	167	41.75
Thomas	1	25	3.75		
Trego					
Wabaunsee	748	3,903	585.45	201	50.25
Wallace	7	50	7.50		
Washington	721	3,328	499.20	51	12.75
Wichita					
Wilson	648	3,715	557.25		
Woodson	182	841	126.15	10	2.50
Wyandotte	223	1,323	198.45		

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GENERAL INDEX.

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LIST OF ILLUSTRATIONS.

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