# Transactions of the Kansas State Board of Agriculture, 1893-94

**Section 17, Pages 481 - 510**

This biennial report from the Kansas State Board of Agriculture includes information on livestock and other agricultural topics. Also covered are county statistics for population, acreages, productions, live stock, assessed valuation of property, and a listing of churches for each county. State statistics, crop and livestock statistics are also included.

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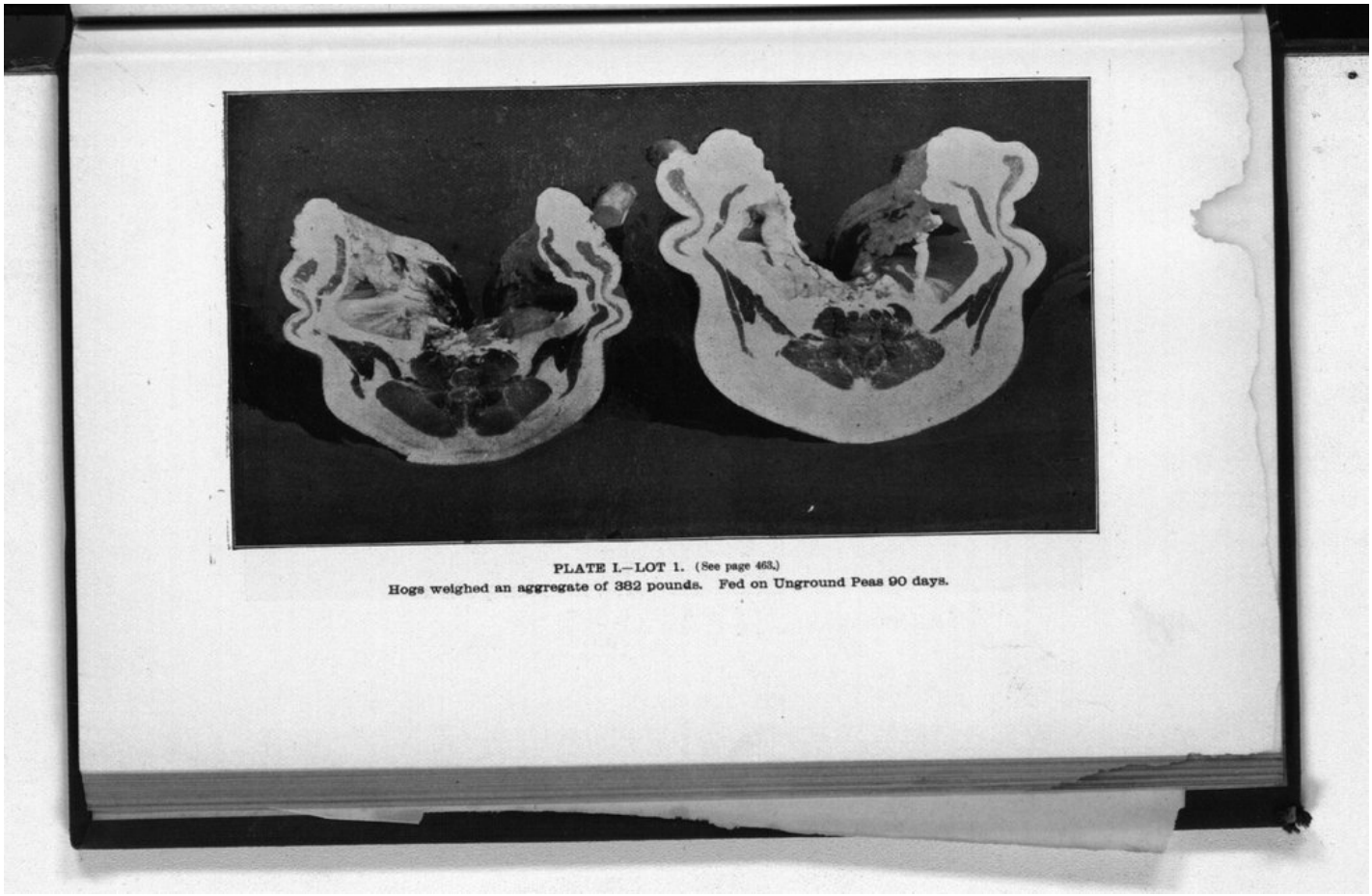

PLATE I.—LOT 1. (See page 463.)
Hogs weighed an aggregate of 382 pounds. Fed on Unground Peas 90 days.

PLATE II.—LOT 2. (See page 463.)
Hogs weighed an aggregate of 377 pounds. Fed on Whole Wheat 90 days.

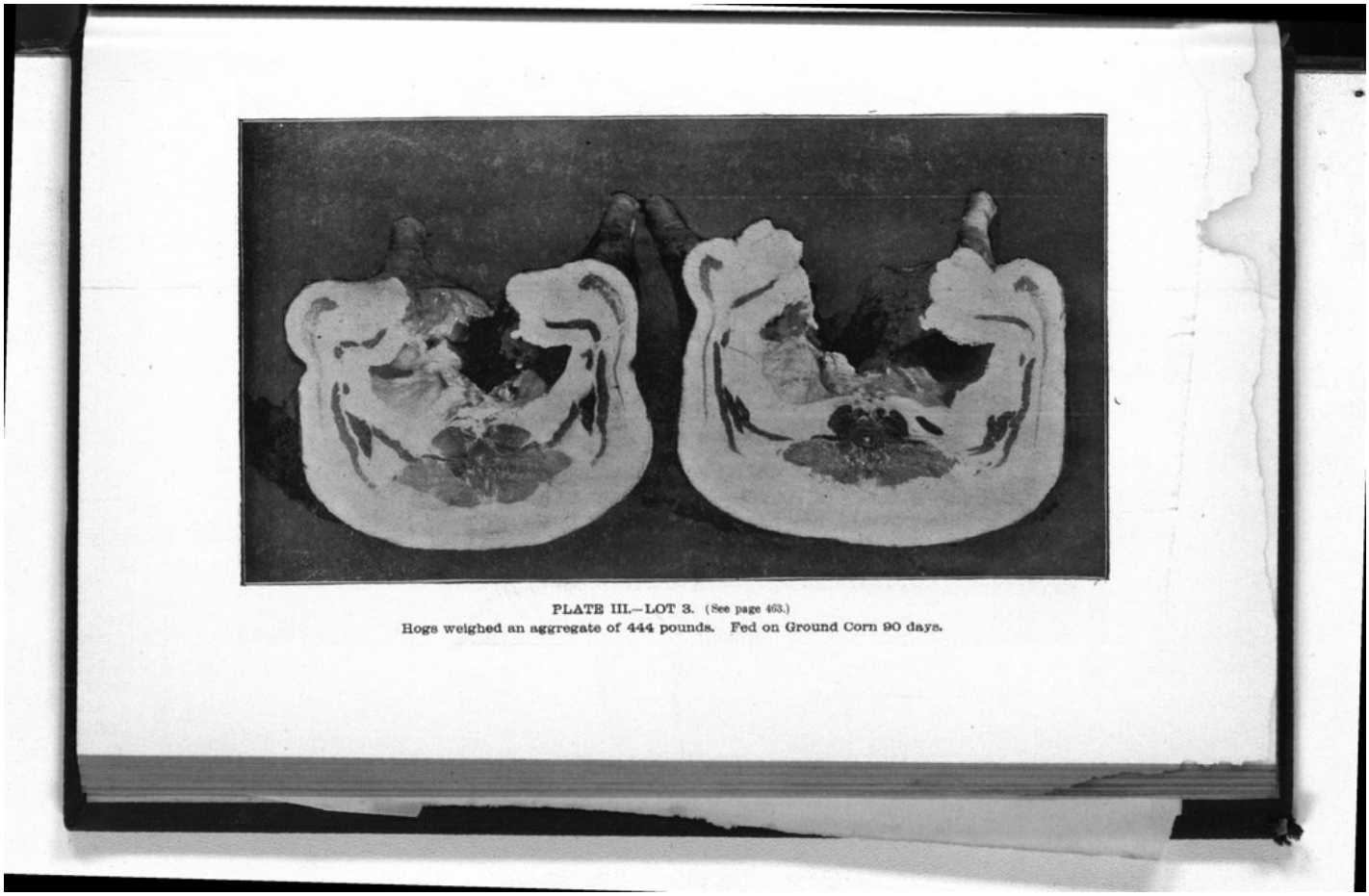

PLATE III.—LOT 3. (See page 463.)
Hogs weighed an aggregate of 444 pounds. Fed on Ground Corn 90 days.

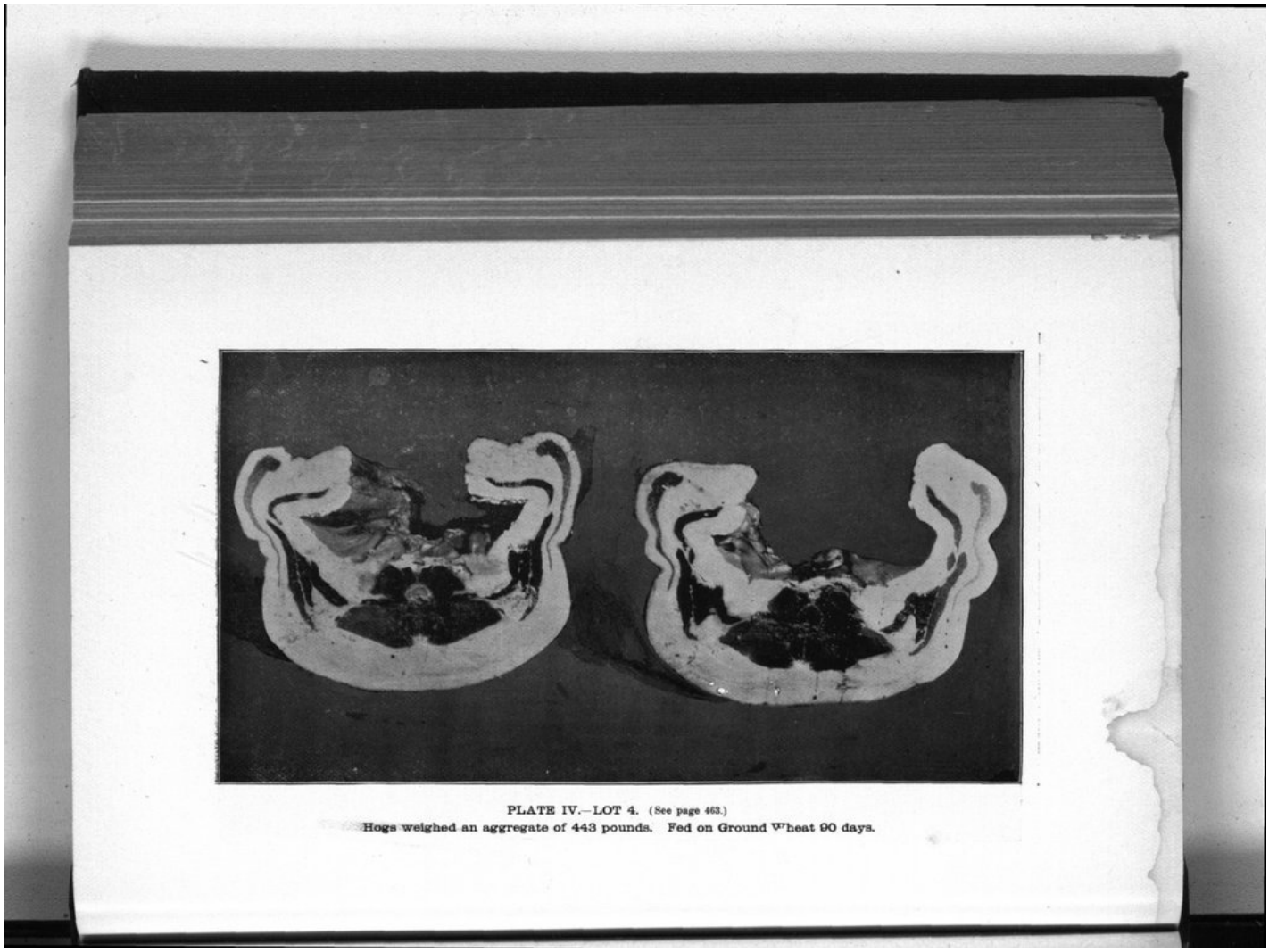

PLATE IV.—LOT 4. (See page 463.)
Hogs weighed an aggregate of 443 pounds. Fed on Ground Wheat 90 days.

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cent. less fattening that shelled corn, producing from 8 to 10 pounds of live pork per bushel. It is more satisfactory for growing than fattening hogs; at the same price per bushel the wheat is preferable, as the flesh of the wheat-fed hog is better than that from corn, it being firmer and less oily. The best ration ever fed to hogs is equal parts of wheat, corn, oats and barley ground together. This is fed to work horses, and maintains their strength and flesh well. The experience of wheat feeders is that it should never be used alone. Mixed with other grain, to cows, it increases very perceptibly the flow of milk. For horses wheat is 10 per cent. more valuable than corn; 20 per cent. more for milch cows, and 10 per cent. less for other cattle. Wheat is selling here for 45 cents and corn for 30 cents, at which prices it can be more profitably fed that shipped or sold. Having a mill to do your own grinding, it will not pay to exchange wheat at the mills for bran or shorts at the current prices for those products. The toll at the mills for grinding is 5 cents per bushel, and this additional expense is more than overcome by the increased value of the feed. I use a "Keystone" horse-power mill, and, allowing $3 per day for man and team, it costs me about 2 cents per bushel to grind my feed. Experience has demonstrated that the above-mentioned mixture fed to farm animals improves their digestion and "livens up" the coat and gives good satisfaction in every way. Computing interest on land worth $40 per acre, and the wear and tear of implements, it costs about 70 cents per bushel to raise 10 bushels of wheat per acre; 15 bushels cost 50 cents; 20 bushels cost 40 cents; 25 bushels cost 33 cents; 30 bushels cost 30 cents; 35 bushels cost 25 cents per bushel.

BUTLER COUNTY.

*C. G. Amlong, Keighley.*—When fed whole, some of it passes the animals without mastication, the proportion being increased by heavy feeding. Pound for pound, wheat seems to be worth about 20 per cent. less than corn, for fattening hogs. The wheat does not make as much live pork per bushel as corn, and the meat is not as solid. A thick, rich slop of ground wheat, supplemented by some corn, is better for fattening hogs. Work horses should have a mixture of equal parts of corn and wheat, of which they should be fed about three quarts. If fed to milch cows, as a slop, wheat enriches the milk, but does not increase the quantity very materially. Wheat is selling here for 42 cents and corn for 34 cents, at which prices it is more profitable to feed than to sell the wheat. The bran sold by the mills is of such a quality that it would not be profitable to exchange the wheat for bran at current prices, but it will pay to get the wheat ground, even when the toll is 10 cents per hundred pounds, as it is here. Farmers run their own grinders, to some extent, by wind power. Where the work is all hired, the following is the estimate of the cost of raising an acre of wheat in this section of the country, on $10 to $20 land:

| | |
|---|---|
| Interest at 7 per cent. on $10 | $0 70 |
| Plowing | 1 00 |
| Seed | 70 |
| Drilling | 25 |
| Harvesting and stacking | 1 15 |
| Thrashing and binning | 60 |
| Total cost of 10 bushels | $4 40 |

CHASE COUNTY.

*James R. Jeffrey, Elmdale.*—Fed to stock, at least 10 per cent. seems to pass without any mastication when used whole. Wheat does not appear to be as nourishing as corn, and when fed to hogs is 10 per cent. less fattening, pound for pound, than shelled corn. Wheat makes about 15 pounds of live pork to the bushel, but the meat is not as firm as that made from corn. Hogs do not seem to relish the wheat, and will not eat it as readily as other food. It is best to chop equal parts of wheat and corn and feed as a slop. Wheat chopped with corn or oats is fed to work

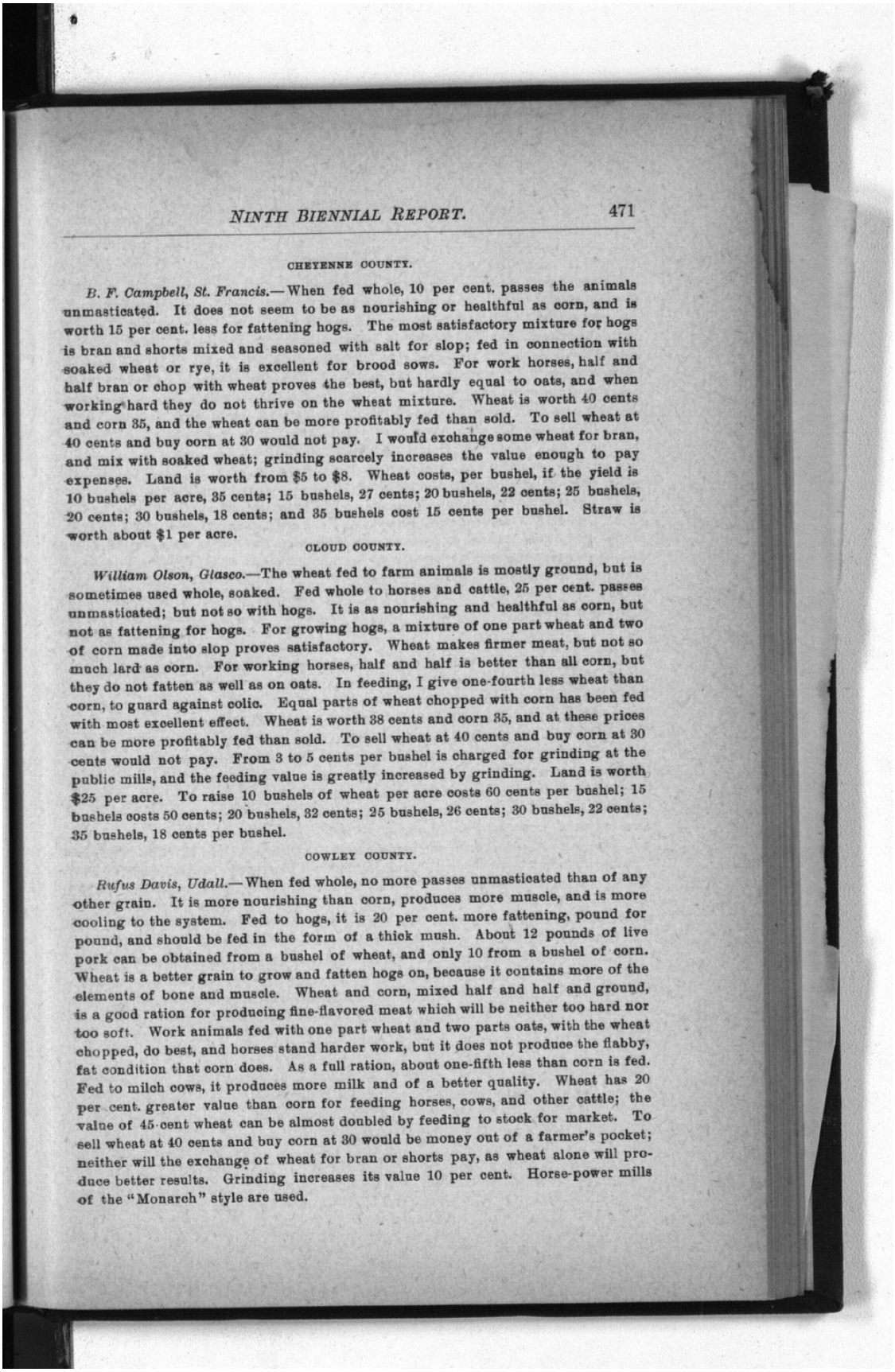
horses, but it does not maintain their strength as well as other grain. It is fed more sparingly than shelled corn—about a fourth less. Milch cows do not eat wheat with as good a relish as they do corn. For feeding horses of any kind or cattle, wheat is worth 25 per cent. less than corn. With corn at 30 cents, it would pay to sell the wheat. The public mills and farm mills charge 5 cents per bushel for grinding, which is a profitable outlay. Counting interest on land worth $30, and the wear and tear of equipment, it costs about 60 cents per bushel to raise 10 bushels of wheat per acre; 15 bushels cost 50 cents; 20 bushels cost 40 cents; 25 bushels cost 38 cents; 30 bushels cost 35 cents; 35 bushels cost 33 cents per bushel. Straw is worth $1 per acre.

CHAUTAUQUA COUNTY.

*J. H. Leedy, Cedar Vale.*—Wheat in this county has been fed to farm animals. It seems to be as healthful and more nourishing than corn, and fed to hogs proves 25 per cent. more fattening, pound for pound, than shelled corn, and the meat of wheat-fed hogs seems to be satisfactory. The best hog ration is two parts of wheat and one of corn, ground and fed dry. Work horses are fed on wheat alone, but it must be ground and fed with care as to quantity. Fed about two-thirds as much ground wheat, horses thrive and fatten better than when fed corn alone. Wheat is a good milk ration, and for horses, milch cows and other cattle it is 33 per cent. more valuable than corn. Wheat is worth 45 cents and corn 35 cents here, at which prices it is more profitable to feed than to sell the wheat. At current prices, it would not be a profitable plan to exchange wheat at the mills for bran and shorts, but it pays to invest the 5 cents per bushel charged by the mills for grinding the wheat, rather than feed it whole. Counting interest at 7 per cent. and the wear and tear of equipment, it costs about 71 cents per bushel to raise 10 bushels of wheat per acre; 15 bushels cost 47 cents; 20 bushels cost 35 cents; 25 bushels cost 28 cents; 30 bushels cost 22 cents; 35 bushels cost 20 cents per bushel. I do not know of a farmer in this part of the county who is not feeding wheat, and who is not well pleased with the results. I have fed 2,500 bushels, while one of my neighbors has fed 300 steers on wheat. Straw has a value of about 75 cents per acre.

CHEROKEE COUNTY.

*M. S. Stillson, Baxter Springs.*—Wheat has been fed to farm animals, sometimes whole to horses, otherwise ground. Whole, fully 10 per cent. seems to pass without mastication. It appears as healthful as corn, and fed to hogs is 10 per cent more fattening than shelled corn. It produces about 11 pounds of live pork per bushel, the meat being sweeter and frying away less in cooking than that made from corn. It is a very satisfactory food for pigs and growing hogs, but for fattening hogs it should be mixed with the same weight of corn chop. It is fed alone to work horses, either whole or chopped, and maintains the strength and flesh about the same as other grains. It is very satisfactory for feeding milch cows, keeping up the flow of milk and the cows in good order. For feeding horses, wheat is about 10 per cent. more valuable than corn; for milch cows, 25 per cent.; and for other cattle 15 per cent. The public mills charge 5 cents a bushel for grinding, and the increased value of the feed will cover it. On land worth $20 per acre, it costs about 60 cents per bushel to raise 10 bushels of wheat per acre; 15 bushels cost 47 cents; 20 bushels cost 42 cents; 25 bushels cost 36 cents; 30 bushels cost 32 cents; 35 bushels cost 28 cents per bushel. I have fed wheat here for three years, some of it being the screenings, where we would clean by taking out more of the lighter grains, thereby raising the grade of the salable wheat. Last year we had a great deal of wheat injured by rust, and the mills and feed stores have kept a good supply of this chopped that has been sold at 5 or 10 cents above bran prices. Nothing equals wheat fed whole for winter food for fowls; it is a great egg-producing food.





CHEYENNE COUNTY.

*B. F. Campbell, St. Francis.*—When fed whole, 10 per cent. passes the animals unmasticated. It does not seem to be as nourishing or healthful as corn, and is worth 15 per cent. less for fattening hogs. The most satisfactory mixture for hogs is bran and shorts mixed and seasoned with salt for slop; fed in connection with soaked wheat or rye, it is excellent for brood sows. For work horses, half and half bran or chop with wheat proves the best, but hardly equal to oats, and when working hard they do not thrive on the wheat mixture. Wheat is worth 40 cents and corn 35, and the wheat can be more profitably fed than sold. To sell wheat at 40 cents and buy corn at 30 would not pay. I would exchange some wheat for bran, and mix with soaked wheat; grinding scarcely increases the value enough to pay expenses. Land is worth from $5 to $8. Wheat costs, per bushel, if the yield is 10 bushels per acre, 35 cents; 15 bushels, 27 cents; 20 bushels, 22 cents; 25 bushels, 20 cents; 30 bushels, 18 cents; and 35 bushels cost 15 cents per bushel. Straw is worth about $1 per acre.

CLOUD COUNTY.

*William Olson, Glasco.*—The wheat fed to farm animals is mostly ground, but is sometimes used whole, soaked. Fed whole to horses and cattle, 25 per cent. passes unmasticated; but not so with hogs. It is as nourishing and healthful as corn, but not as fattening for hogs. For growing hogs, a mixture of one part wheat and two of corn made into slop proves satisfactory. Wheat makes firmer meat, but not so much lard as corn. For working horses, half and half is better than all corn, but they do not fatten as well as on oats. In feeding, I give one-fourth less wheat than corn, to guard against colic. Equal parts of wheat chopped with corn has been fed with most excellent effect. Wheat is worth 38 cents and corn 35, and at these prices can be more profitably fed than sold. To sell wheat at 40 cents and buy corn at 30 cents would not pay. From 3 to 5 cents per bushel is charged for grinding at the public mills, and the feeding value is greatly increased by grinding. Land is worth $25 per acre. To raise 10 bushels of wheat per acre costs 60 cents per bushel; 15 bushels costs 50 cents; 20 bushels, 32 cents; 25 bushels, 26 cents; 30 bushels, 22 cents; 35 bushels, 18 cents per bushel.

COWLEY COUNTY.

*Rufus Davis, Udall.*—When fed whole, no more passes unmasticated than of any other grain. It is more nourishing than corn, produces more muscle, and is more cooling to the system. Fed to hogs, it is 20 per cent. more fattening, pound for pound, and should be fed in the form of a thick mush. About 12 pounds of live pork can be obtained from a bushel of wheat, and only 10 from a bushel of corn. Wheat is a better grain to grow and fatten hogs on, because it contains more of the elements of bone and muscle. Wheat and corn, mixed half and half and ground, is a good ration for producing fine-flavored meat which will be neither too hard nor too soft. Work animals fed with one part wheat and two parts oats, with the wheat chopped, do best, and horses stand harder work, but it does not produce the flabby, fat condition that corn does. As a full ration, about one-fifth less than corn is fed. Fed to milch cows, it produces more milk and of a better quality. Wheat has 20 per cent. greater value than corn for feeding horses, cows, and other cattle; the value of 45-cent wheat can be almost doubled by feeding to stock for market. To sell wheat at 40 cents and buy corn at 30 would be money out of a farmer's pocket; neither will the exchange of wheat for bran or shorts pay, as wheat alone will produce better results. Grinding increases its value 10 per cent. Horse-power mills of the "Monarch" style are used.

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CRAWFORD COUNTY.

*N. W. Taylor, Mulberry.*—Some of the wheat crop of last year has been used whole, soaked, but as a rule has been ground. Nearly half passes unmasticated when fed whole. It is as nourishing and healthful as corn, and when fed to hogs proves as fattening, pound for pound. Leaving out the question of cost, the wheat fattens the hogs as fast or faster than corn, and the flesh is finer. At the beginning, it should only be given in moderate quantities, and soaked, as too much fed dry may cause constipation. The best hog feed I have found is two parts wheat one part corn, and one part oats. I mix equal parts of wheat, corn, and oats, and have a fine ration for work horses and milch cows. This keeps the horses up to their work and the hair lively on cows, while they give more milk. Wheat sells here for 40 cents per bushel, and corn for 35; it pays better to feed than to sell the wheat, even if the corn could be had for 30 cents. It costs 10 cents per hundred to get feed ground at the public mills, and the enhanced results warrant the expense. On land worth $25, and counting interest at 7 per cent., labor, and wear and tear of implements, it costs about 65 cents per bushel to raise 10 bushels of wheat per acre; 15 bushels cost 50 cents; 20 bushels, 40 cents; 25 bushels, 35 cents; 30 bushels, 30 cents; and 35 bushels, 27 cents per bushel. While I think there is nothing quite equal to corn as a grain for animals, yet, with live pork at 5 cents per pound and beef 4 to 5, there is more money in feeding wheat than in selling it at 40 cents.

DECATUR COUNTY.

*J. H. Sales, Norcatur.*—About one-half of the wheat in this county has been fed to farm animals the past year. It is more nourishing and healthful than corn, and at the same price per bushel it is at least 20 per cent. more valuable for feeding hogs. From 15 to 17 pounds of live pork is about a fair average return from a bushel of wheat. Wheat and corn in equal parts, ground with one-eighth its weight in oil cake added, make the best feed that I ever used for young hogs. Wheat, with one fourth corn meal added, is a superior feed for milch cows. Wheat is selling here for 40 cents, and corn for 30 cents; but the wheat is worth 75 cents for feeding to young hogs. I would not consider it profitable to use bran costing 50 cents per hundred when I can get ground wheat at 75 cents per hundred. With the "Hero" mill, two men and four horses can grind about 100 bushels of feed in a day. Wheat land here is worth $20 per acre. Counting interest and all wear and tear of implements, it costs about 60 cents per bushel to raise 10 bushels of wheat per acre; 15 bushels cost 50 cents; 20 bushels, 40 cents; 25 bushels, 35 cents; 30 bushels, 32½ cents; and 35 bushels, 30 cents. I am raising Poland-China swine, and I have found that I can get far better results from a mixture of 15 bushels of wheat and 10 of corn than from 35 bushels of corn, and the pigs are far more valuable as breeders. One feeder reports his experience, and my own confirms its correctness. He fed 2,500 bushels of corn in 1892, and the next year fed 1,000 bushels of wheat and 400 bushels of corn, mixed and ground fine, and secured the most pork from the 1,400 bushels of mixture.

DICKINSON COUNTY.

*H. K. Burkholder, Holland.*—The wheat of last year in this county fed to farm animals has been dry, soaked, cooked, but mostly chopped. When fed whole, about 40 per cent. seems to pass the animals without mastication. It is as healthful, and, when chopped or cracked, seems as nourishing as corn. Fed to hogs, it proves as fattening, pound for pound, as corn, and at least 30 per cent. more desirable, while for pigs one bushel of wheat is worth two of corn. Cracked and fed dry to horses, it is a very satisfactory feed, and with a less quantity they can be kept in good strength. It is 50 per cent. better than corn for feeding milch cows, and is good

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for calves. Wheat sells here for 38 cents and corn for 30 cents, at which prices it is better to feed the wheat to the stock. From the feeder's standpoint it will not pay to exchange the wheat at the public mills for bran or shorts. Better chop the wheat or pay 5 cents for grinding. I use a "Stover" sweep "chopper," and a man and a team can chop 100 bushels per day. Allowing one-third for rent of land, it costs 35 cents per bushel to raise 20 bushels of wheat per acre. For over a year I have been feeding wheat, mostly to young hogs. I paid 5 cents per bushel for chopping, and with about half the usual quantity of feed obtained a vigorous growth. I then tried cooking, feeding the whole grain in a very soft condition, but over half of it passed the hogs without mastication. By mixing some corn with it, they would chew the wheat better. Then I tried chopping, and am still following that plan. Chopped (coarsely ground) wheat fed dry to horses is very good, but if ground too fine and fed damp the dough adheres to their mouths. The bran or hull of the wheat is very tough when wet, and, as very few animals will properly chew the whole grain, much of it must necessarily pass unmasticated.

DOUGLAS COUNTY.

*John Manwaring, Lawrence.*—The wheat in this county, fed to farm animals, is used in every form, and is said to be as nourishing and healthful as corn. For hogs, it is good for fattening, and has proved very satisfactory. For horses, it is ground and fed with corn chop. Grinding costs 10 cents per 100 pounds at the public mills, and the feed is much improved when ground and made into slop. To raise 10 bushels per acre, it costs 62 cents; 15 bushels, 42 cents; 20 bushels, 33 cents; 25 bushels, 27 cents; 30 bushels, 23 cents; 35 bushels, 20 cents per bushel. Wheat straw is worth $1 per acre, and land $25 to $50 per acre. The table following will show the cost of raising 10 bushels of wheat; the expense of labor is the same for 10 bushels as for 35 per acre. A greater yield per acre will be the same in expense as 10 bushels only, adding 4 cents for every additional bushel for thrashing.

| | |
|---|---|
| For plowing an acre | $1 00 |
| Harrowing | 10 |
| Drilling | 20 |
| Seed, at present prices | 50 |
| Cutting and putting in shock | 1 25 |
| Thrashing, at 4 cents per bushel | 40 |
| Labor in thrashing | 17 |
| Interest on land worth $30 per acre | 2 10 |
| Wear and tear of equipment | 50 |
| Total | $6 22 |

ELLSWORTH COUNTY.

*G. W. Clawson, Ellsworth.*—In November, 1893, I put on a full feed of wheat about 800 head of Panhandle, Texas, steers, and fed them for a period of four months. These steers were from ranges where they were unused to grain food of any kind. They were fed a mixture consisting of about 60 per cent. corn and 40 per cent. wheat, chopped or ground coarsely on a horse-power grinder. I have had, for the last eight years, experience covering the same months each year in feeding about the same number and quality of Western steers. During the prior feeding seasons I fed corn entirely, usually shelled. My experience in feeding the mixed food was entirely satisfactory, both as to the quickness of time in which I could get the animals to rightly take hold of the food, and also as to the results obtained; and I have no hesitancy in saying that steers fed on a mixture of wheat and corn, in about the above proportions, will gain pounds a great deal faster than on corn alone. During the season, I fed 9,000 bushels of wheat of my own raising, in this county. About half of this was fed to cattle, as stated; the remainder was ground coarsely and fed direct to hogs, in the nature of slop. Careful experiments showed

that a bushel of dry corn put on 14 pounds of pork, and a bushel of wheat ground and fed as slop made 17 pounds.

I am this year feeding, on this same farm, 16,000 bushels of wheat; 4,000 bushels of this was of my own raising, and 12,000 bushels were purchased locally, at prices ranging from 28 to 37 cents per bushel, or at an average price of 35 cents. I had on the Kansas City market, a short time since, a car load of pigs, fattened entirely on wheat, which brought $6.10 per hundred, and averaged 249 pounds. These pigs never knew the taste of corn.

I have at this time more than 1,600 head of hogs of my own raising. These comprise fattening hogs, pigs of all ages and descriptions, stock hogs, and breeding hogs; and, during the last 10 months, I have fed no corn whatever, nor do I expect to as long as I can buy wheat at or about the same price as corn. All ages and grades of hogs appear to thrive better on wheat than on corn. My hogs have been entirely free from disease. Where a bushel of wheat, costing 35 cents, puts on 17 pounds of 6-cent pork, there can be no question of the profitableness of wheat feeding. For feeding wheat to hogs, I advise grinding the grain coarsely and soaking it, and using as a slop. I have fed some dry, whole wheat to hogs, but feel confident that, owing to defective mastication, better results can be obtained by grinding and soaking. I consider wheat superior to corn as a food for hogs, and that a bushel of wheat will put on at least 10 per cent. more in weight than a bushel of corn.

ELK COUNTY.

*W. S. Brundage, Oak Valley.*—When fed whole, about 25 per cent. seems to pass the animals unmasticated. The wheat ration seems as nourishing as shelled corn. When fed to hogs, it produces about 10 pounds of pork to the bushel, and, for fattening, seems a little better than corn, and the meat is about as good, but, perhaps, not quite so solid as corn-fed pork. My best results have been obtained from feeding equal parts of wheat and corn and a little oil cake. Nothing is quite so good for work horses as oats, but the next best feed is wheat and a little oil cake. My horses thrive and fatten on that ration better than on corn alone. Wheat is the best feed for milch cows; but for putting on flesh, I can get the best results from corn meal and oil cake. Wheat is worth 45 cents here, and corn the same, at which prices it is better to feed than to ship the wheat. The bran and shorts we get at the mills are really higher than the wheat, and we can get our grinding done on "Victor" and "Little Giant" farm mills for about 4 cents per bushel. On land worth $40 per acre, it costs me to raise 10 bushels of wheat on an acre as follows:

| | |
|---|---|
| Interest on land | $2 80 |
| Plowing | 1 00 |
| Harrowing and drilling | 75 |
| Seed, 2 bushels | 1 00 |
| Cutting and thrashing, 10 bushels | 2 25 |
| Wear of tools | 20 |
| Total | $8 00 |

On this basis, 10 bushels cost 80 cents per bushel; 15 bushels cost 56 cents; 20 bushels, 47 cents; 30 bushels, 36 cents per bushel.

FORD COUNTY.

*J. L. Finley, Dodge City.*—Some of it has been fed dry, but most of it is now soaked, as nearly a fourth of the dry grain passes unmasticated. It is nearly as nourishing as corn, and is as healthful but not as fattening for hogs, being worth about 25 per cent. less than corn for that purpose. The meat of wheat-fed hogs is better than that of corn-fed, being firmer and containing less fat. For feeding hogs, the wheat is much improved by adding at least a fourth the quantity of corn meal. Horses do well on soaked wheat, but do not fatten as well as when fed corn

or oats. It is good for milch cows, but worth 10 per cent. less for other cattle. Wheat sells here for 40 cents and corn for 45 cents per bushel, and as long as prices remain anywhere near these figures it will pay to feed the wheat. If not too long a haul, I would exchange some wheat for bran and shorts at the mills, but I do not think the work of grinding chop for all the feeding pays for the trouble and expense. On land worth $5 per acre, it is worth 60 cents per bushel to raise 10 bushels of wheat per acre; 15 bushels cost 50 cents; 20 bushels, 45 cents; 25 bushels, 40 cents; and 30 bushels, 30 cents per bushel. Wheat is a better crop in this portion of the state than corn, and if it remains as low in price as at present there will be a large quantity fed. It is better for poultry and milch cows, and when ground is excellent for pigs and young hogs. Corn is better to finish fat hogs and beef cattle. The straw has a value of about $1 per acre.

FRANKLIN COUNTY.

*C. H. Estabrook, Ottawa.*—Our experience in feeding wheat has been confined almost exclusively to hogs. We grind it and find it as nourishing and as healthful as corn, and, when fed to hogs, produces from 15 to 18 pounds of pork to the bushel. I consider it about 50 per cent. more valuable than corn for that purpose, and the meat made from wheat-fed hogs is better than that made with corn, but the best results are to be obtained by feeding wheat and corn together. Wheat is worth 50 cents and corn 30, at which prices I can feed my wheat at greater profit than to sell it and buy corn. We have a farm mill, and, by grinding our own feed at times not otherwise occupied, we spend no more time than it would take to go to the mill, and we have the price charged for grinding saved. It is better to grind than to exchange for mill stuffs, as then you know just what you are getting. My last crop of wheat was grown on land worth $25 per acre, and the average yield was 18 bushels, which cost me, in the bin, just 27 cents per bushel, not reckoning anything for interest on investment.

GEARY COUNTY.

*J. P. Fall, Junction City.*—By experimenting, we found that a very large percentage passed the animals unmasticated, if fed whole; therefore, grinding and soaking were resorted to, and the results have proven very satisfactory, it being as nourishing and healthful as corn. Ground and made into a slop, is excellent for brood sows and pigs. My work horses have been fed ground wheat, and kept in fine condition, both as to flesh and strength, using about one quart to a feed. I have fed about 2,000 bushels of wheat to cattle the past winter, mixing about one bushel of ground wheat with four of shelled corn, and I never had stock to do better. Have used oil cake for 10 years, but prefer wheat to the new-process oil cake. I would feed wheat rather than sell it at 50 cents; I have none for sale at that price, except in the form of live stock. The exchange of wheat at the mills for bran or shorts is very unprofitable, for they largely consist of hulls and dirt. The value of the feed, when ground, is increased more than enough to pay for the grinding, which is 5 cents per bushel at the public mills.

GRAHAM COUNTY.

*G. Godard, Morland.*—I am feeding my stock wheat, but always ground, and find it as nourishing and healthful as corn. Fed whole, from 10 to 20 per cent. passes unmasticated. For hogs, I find that wheat (60 pounds) is a little better than corn (56 pounds). It is better for fattening hogs to mix about half corn, and grind, and soak it in not too much water. For my work horses, I mix corn and wheat, and grind, of which I feed about a third less than I would of shelled corn. This ration is just as good for milch cows as corn; but my notion is that chopped corn contains more heat, and that is what the cow must have to give milk. Wheat and corn

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are worth 40 cents here, and with corn at 30 cents I do not believe it would pay to sell the wheat and buy corn, at least not for horses. I believe it will pay to sell the wheat and buy bran or shorts, as a ton of wheat will bring $13.25, and a ton of bran or shorts can be had for about one half that amount. I have a "Peerless" mill on my farm, and get 4 cents for grinding, or one-eighth toll. On $5 land, it costs 60 cents per bushel to grow 10 bushels of wheat per acre; 15 bushels, 55 cents; 20 bushels, 50 cents; 25 bushels, 45 cents; 30 bushels, 40 cents; and 35 bushels, about the same. I will say parenthetically, that I have some conscientious scruples about feeding wheat to stock, except in cases of great emergency, as it was by nature intended as food for the human family.

HARVEY COUNTY.

*W. M. Congdon, Sedgwick.*—Wheat in this county fed to live stock was mostly ground, and some soaked, but none dry and whole. It appears to be more healthful than corn, and when fed to fattening hogs makes about 15 pounds of pork to the bushel. My experience and that of my neighbors who have tried feeding it as I do is, that, at present prices of stock, we realize from 75 to 90 cents per bushel for our wheat. The best plan is to feed the clear wheat to pigs and growing hogs, ground and in the form of a slop, but for fattening hogs we grind together one part corn and two parts wheat. To my work horses I have fed the wheat alone, and in various proportions with oats and corn, but do not feed as heavy a ration of the wheat. They thrive and fatten as well as on other feed. The wheat fed to milch cows increases the flow of milk and keeps up the quality. At the same price per bushel, I estimate that wheat is 25 per cent. more valuable than corn for feeding horses, 50 per cent. more for milch cows, and 25 per cent. more for other cattle. It is now selling here for 38 and corn for 32 cents per bushel, at which prices I would never ship or sell the wheat to millers. With wheat at 40 and corn at 30 cents per bushel, I would not haul both ways to sell the one and buy the other, nor would I sell the wheat to the mills for bran or shorts. It costs us 5 cents per bushel to get our feed ground, and this expense is more than overcome by the good results. Some of our farmers have wind- and horse-power mills, and do their own grinding, at a small expense. On land worth $25 per acre, it costs me 50 cents per bushel to raise 10 bushels of wheat per acre; 15 bushels, 40 cents; 20 bushels, 37 cents; 25 bushels, 35 cents; 30 bushels, 32½ cents; and 35 bushels, 30 cents per bushel.

JACKSON COUNTY.

*J. E. Hoagland, Whiting.*—For hogs, I feed one part of wheat, as a slop, to three parts of corn, fed whole, and get best results. For work animals, I use equal parts of wheat, oats, and corn, ground and fed damp with cut hay or straw, and consider it a grand ration. Wheat is worth 40 and corn 30 cents per bushel, at which prices I prefer to sell the wheat and buy corn. Land worth $35 per acre here will produce 10 bushels of wheat at a cost of 64 cents per bushel; 15 bushels, 46 cents; 20 bushels, 32 cents; 25 bushels, 31 cents; 30 bushels, 28 cents; and 35 bushels, 26 cents per bushel. For 25 years I have used wheat as feed for farm animals, but always as a slop. Weight for weight, I consider shorts better than whole wheat. I am now feeding ground wheat that cost me 75 cents per 100 pounds, and shall next buy shorts at 80 cents per 100 pounds for my hogs. I consider bran better than shorts for milch cows. This is not a wheat-raising country, and the wheat which is being fed is mostly by small farmers, who raise but a small quantity.

JEFFERSON COUNTY.

*James Mains, Oskaloosa.*—It has been mostly ground, and soaked from 6 to 10 hours, for the reason that if fed whole about half passes unmasticated. It is found

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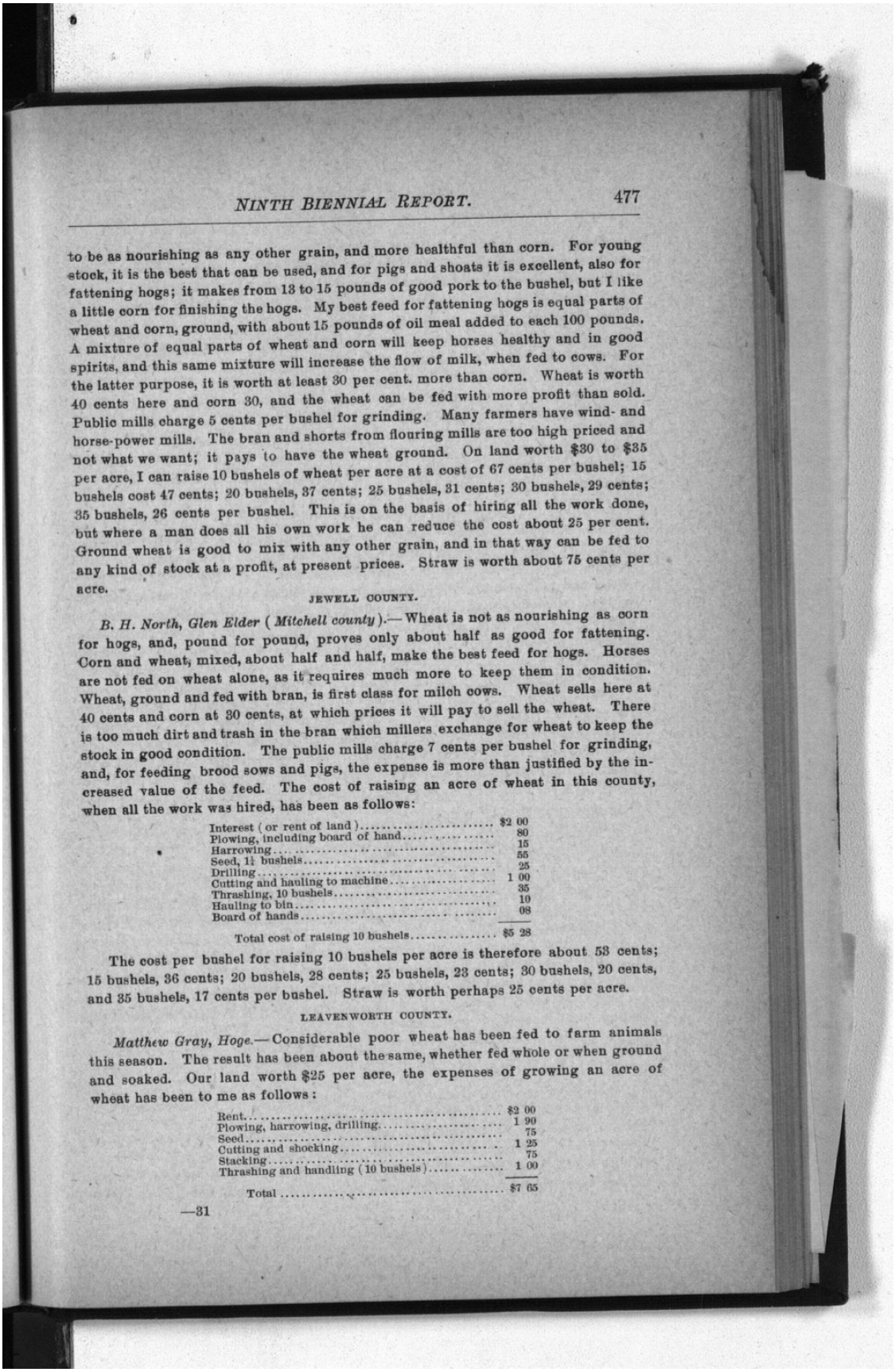



to be as nourishing as any other grain, and more healthful than corn. For young stock, it is the best that can be used, and for pigs and shoats it is excellent, also for fattening hogs; it makes from 13 to 15 pounds of good pork to the bushel, but I like a little corn for finishing the hogs. My best feed for fattening hogs is equal parts of wheat and corn, ground, with about 15 pounds of oil meal added to each 100 pounds. A mixture of equal parts of wheat and corn will keep horses healthy and in good spirits, and this same mixture will increase the flow of milk, when fed to cows. For the latter purpose, it is worth at least 30 per cent. more than corn. Wheat is worth 40 cents here and corn 30, and the wheat can be fed with more profit than sold. Public mills charge 5 cents per bushel for grinding. Many farmers have wind- and horse-power mills. The bran and shorts from flouring mills are too high priced and not what we want; it pays to have the wheat ground. On land worth $30 to $35 per acre, I can raise 10 bushels of wheat per acre at a cost of 67 cents per bushel; 15 bushels cost 47 cents; 20 bushels, 37 cents; 25 bushels, 31 cents; 30 bushels, 29 cents; 35 bushels, 26 cents per bushel. This is on the basis of hiring all the work done, but where a man does all his own work he can reduce the cost about 25 per cent. Ground wheat is good to mix with any other grain, and in that way can be fed to any kind of stock at a profit, at present prices. Straw is worth about 75 cents per acre.

JEWELL COUNTY.

*B. H. North, Glen Elder (Mitchell county).*—Wheat is not as nourishing as corn for hogs, and, pound for pound, proves only about half as good for fattening. Corn and wheat, mixed, about half and half, make the best feed for hogs. Horses are not fed on wheat alone, as it requires much more to keep them in condition. Wheat, ground and fed with bran, is first class for milch cows. Wheat sells here at 40 cents and corn at 30 cents, at which prices it will pay to sell the wheat. There is too much dirt and trash in the bran which millers exchange for wheat to keep the stock in good condition. The public mills charge 7 cents per bushel for grinding, and, for feeding brood sows and pigs, the expense is more than justified by the increased value of the feed. The cost of raising an acre of wheat in this county, when all the work was hired, has been as follows:

| | |
|---|---|
| Interest (or rent of land) | $2 00 |
| Plowing, including board of hand | 80 |
| Harrowing | 15 |
| Seed, 1½ bushels | 55 |
| Drilling | 25 |
| Cutting and hauling to machine | 1 00 |
| Thrashing, 10 bushels | 35 |
| Hauling to bin | 10 |
| Board of hands | 08 |
| Total cost of raising 10 bushels | $5 28 |

The cost per bushel for raising 10 bushels per acre is therefore about 53 cents; 15 bushels, 36 cents; 20 bushels, 28 cents; 25 bushels, 23 cents; 30 bushels, 20 cents, and 35 bushels, 17 cents per bushel. Straw is worth perhaps 25 cents per acre.

LEAVENWORTH COUNTY.

*Matthew Gray, Hoge.*—Considerable poor wheat has been fed to farm animals this season. The result has been about the same, whether fed whole or when ground and soaked. Our land worth $25 per acre, the expenses of growing an acre of wheat has been to me as follows:

| | |
|---|---|
| Rent | $2 00 |
| Plowing, harrowing, drilling | 1 90 |
| Seed | 75 |
| Cutting and shocking | 1 25 |
| Stacking | 75 |
| Thrashing and handling (10 bushels) | 1 00 |
| Total | $7 65 |

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On this basis, it will be seen that a yield of 10 bushels per acres costs me 75 cents per bushel; 15 bushels cost 55 cents; 20 bushels, 43 cents; 25 bushels, 37 cents; 30 bushels, 34 cents, and 35 bushels, 30 cents per bushel.

LINCOLN COUNTY.

*Bredes & Minx, Lincoln.*—We are feeding wheat extensively, mixing about three parts corn and one part wheat. One bunch of steers is consuming about 125 bushels of this mixture per day, ground and fed dry. We are satisfied that this is worth 25 per cent. more for feeding steers than corn would be if fed alone. For work animals, it is better than shelled corn; they thrive and keep up their strength on it better than on corn. Wheat, at the present time, is worth 35 cents here, and corn 32 cents, at which prices the wheat can be fed to farm animals at more profit than sold to millers. We do not care to exchange any wheat for the bran or shorts at the mills. We use wind, steam and horse power, and grind our feed at the nominal price of about 1 cent per bushel.

MARION COUNTY.

*Thos. M. Potter, Peabody.*—Wheat fed to farm animals here is either ground or soaked, and appears to be as nourishing and healthful as shelled corn, and, pound for pound, produces as much pork, averaging about 10 pounds per bushel. Leaving cost out of the question, I have found it as satisfactory for growing or fattening hogs as corn, and the flesh of the wheat-fed hogs is as good as that produced by other staple foods. For work animals, I mix equal parts of corn or oats, and my horses thrive and fatten, the ration being about the same in quantity. It costs approximately 65 cents a bushel to raise 10 bushels per acre of wheat, on land worth $25, counting the straw of each acre worth about 50 cents; 15 bushels cost 45 cents; 20 bushels, 35 cents; 25 bushels, 27 cents, and 30 bushels, 22 cents per bushel. Wheat is worth here 37 and corn 35 cents per bushel. At these prices, it is as profitable to feed as to sell the wheat, but I cannot exchange it for bran or shorts on terms at all advantageous. It costs but little, perhaps 2½ cents per bushel, to grind into a chop, and the better results obtained much more than offset the expense.

MARSHALL COUNTY.

*C. B. Thummel, Axtell.*—June 1, I put in a dry pen 20 hogs, weighing 3,850 pounds, or an average of 192½ pounds—good, thrifty ones, out of feed lot and pasture. They were put on wheat of poor quality (possibly No. 3), soaked 12 hours. It was fed in clean troughs three times a day, with good drinking water. They had no other food or slop of any kind. They were weighed as follows: June 1, 3,850 pounds; June 8, 4,080; June 15, 4,300; average gain, 30 pounds; daily gain, 1½ pounds. I was then called from home, and gave the care of the hogs to a trusty man, who put them on soaked corn, and fed as before for 14 days, with the following results: June 15, they weighed 4,300 pounds; June 29, 4,520; gain, 220 pounds; daily gain, three-fourths of a pound per head. It seemed to me that that man took better care of the hogs than I did. I was sorry that the test was not made all under one man's feeding, but you have the results, and can draw your own conclusions. I certainly was surprised at the results. I wished to find out by actual test what wheat was worth, as the average farmer would feed it. With hogs selling at 4½ cents per pound, the wheat netted 50 cents per bushel.

I think that the wheat should be ground, as hogs do not chew it long enough to get the full benefit. Much of the wheat passed off whole—from one fifth to one-fourth, I should judge. I might add, that had these hogs not been taken off grass, the results as to pounds gained would have been largely increased, as they had been running out and had grass and water. Putting them in a close pen, deprived of running water and grass, the change was severe, as the weather had grown very hot.

I had considerable old wheat on hand, and wished to ascertain whether it was best to sell the wheat and buy corn or feed wheat. I think that any farmer had better feed wheat than sell at less than 50 cents per bushel, with hogs and cattle at 4 to 4½ cents per pound. At present prices for hogs and cattle, wheat should, as fed by the average farmer, be worth 75 cents per bushel, at least. I have also fed some cattle on wheat. They were put on wheat and one-fourth corn, ground together in a common sweep cob-and-corn grinder. Much of the wheat remaining whole, in order that cattle might get the best results, I added corn cobs and ground all together. The cobs were added to keep the cattle from scouring, and it was a great success.

In order that the reader may fully understand, I will give a short history of the cattle: I call them my "baby cattle," as they were only yearlings, mostly full-blood Shorthorns, 15 head. They were put on feed April 1, last; had been well wintered, but with no view of such early fattening. I wished to see what young steers were worth as feeders; whether it was best to feed at a year old, or grass through and wait until they were two years old. April 1 (the day they received their first feed), the little cattle averaged 500 pounds.

| | | |
|---|---|---|
| The 15 head weighed: | April 1 | 7,500 pounds. |
| | April 15 | 8,080 " |
| | April 26 | 8,180 " |

Then two steers were added, and all turned on grass. The steers added were six months older; had been in feed lot four months, and were also full bloods; their weight was 1,950 pounds; the cattle now had pasture to themselves, 15 acres, and feed box in the pasture, with feed continued. The feed was ear corn crushed or ground, cob and all.

| | | |
|---|---|---|
| The 17 head weighed: | April 26 | 10,130 pounds. |
| | June 17 | 12,830 " |
| | August 15 | 14,540 " |

A gain of 300 pounds per steer for 137 days' feed—very good for calves. August 15, I put the cattle on ground wheat and corn; the weather had become very hot and dry; the grass had dried up, the water was poor and warm, and flies troublesome.

| | | |
|---|---|---|
| August 15, they weighed | | 14,540 pounds. |
| September 7, they weighed | | 15,630 " |

A gain of 1,090 pounds in 22 days, or a daily gain of nearly three pounds. We have results as follows: 159 days' feeding gave 6,180 pounds, or an average gain of 364 pounds per head. These cattle were weighed in the morning each time, as nearly as possible under the same circumstances. The design of their feeding is to make Christmas cattle of the little fellows, feeding to December 10, noting results, their cost, and the price they bring. Every farmer I talk with is more than satisfied with the results of feeding wheat, and if wheat and corn remain together in price, the Kansas wheat crop of this year will largely be fed to stock. I know of one man who thrashed out 5,000 bushels of No. 1 wheat, and says he will feed the last bushel, unless he can sell for more than 50 cents per bushel. All feel the same; they would rather sell what corn they have and feed wheat at present prices.

MIAMI COUNTY.

*A. W. Crawford, Bucyrus.*—Wheat in this county last year fed to farm animals was used chiefly whole and soaked. When fed whole, about 50 per cent. passes without mastication. It does not appear as healthful and nourishing as corn; fed to hogs, it proves 10 per cent. more fattening, pound for pound, than corn, but the best plan is to mix half and half with corn. Wheat is worth 40 cents and corn 30. For hogs, it will pay better to feed than to sell the wheat. For cows, it would be profitable to exchange some of the wheat for bran or shorts. The public mills charge 10 cents for grinding wheat, and the increased value more than covers this.

On land worth $40 per acre, it costs about 80 cents per bushel to raise 10 bushels per acre; 15 bushels, 65 cents; 20 bushels, 55 cents; 25 bushels 50 cents. It requires very careful feeding to make stock thrive any great length of time on wheat. Hogs, and horses also, will eat heartily of it for two to four weeks, and then they need a change to grass, corn or oats, after which they can be successfully brought back to wheat. I have the best results from feeding wheat in the sheaf to stockers, as in that manner they never get a surfeit.

MITCHELL COUNTY.

*William Kettler, Beloit.*—Whole, about 10 per cent. passes without chewing. It is as nourishing and healthful as corn, and much more so for young hogs. At the same price, wheat is worth 20 per cent. more than corn for hogs. For young hogs, there is nothing equal to it, but for fattening, one part corn and two parts wheat is the most satisfactory. Work horses are fed ground wheat, but when not ground it is mixed with something coarser and lighter in quality; but they will do better work and come out looking better if fed on oats and corn. Ground wheat is superior feed for cows in milk. Wheat sells here for 35 cents and corn for 30 per bushel, at which prices it is more profitable to feed than sell the wheat. If wheat could be sold for 40 cents, it would not be profitable to haul both ways to sell wheat and buy corn For feeding everything but hogs, it might be better to exchange the wheat for bran and shorts, at current prices. Public mills charge 5 cents per bushel, and farm mills about 3 cents, for grinding wheat, and its value for feed is increased enough to pay the expense. Computing 7 per cent. interest on $15 land, labor, and wear and tear, it costs about 50 cents to raise one bushel of wheat when the yield is 10 bushels per acre; 15 bushels, 38 cents; 20 bushels, 31 cents; 25 bushels, 26 cents; 30 bushels, 24 cents; 35 bushels, 22 cents per bushel. Straw is worth 25 cents per acre. During 22 years' farming in this county, this is the fourth year I have fed wheat, but have never fed good wheat to farm animals when corn was plentiful; this year I am feeding about 1,000 bushels.

MORRIS COUNTY.

*J. S. Loomis, Diamond Springs.*—When fed whole, 20 per cent. passes without mastication. Ground wheat appears as healthful and nourishing as corn, and, fed to hogs, it produces about 15 pounds of live pork per bushel, the flesh being equal to that from corn. Until pigs are six months old, there is nothing equal to ground wheat for feeding them, summer or winter, but after that age they should have half and half wheat and corn, ground together. Wheat fed to horses puts on fat, but does not maintain their strength equal to corn. Only one-half as much wheat is required for a ration as is used of corn. For feeding milch cows, it is ahead of corn, pound for pound. Wheat is selling here for 40 cents and corn for 30, at which prices it is far more profitable to feed the wheat. It is not profitable to exchange the wheat at the mills for bran and shorts at current prices of each, as these do not fatten; they increase the milk, but not the butter. The public mills charge 4 cents per bushel for grinding, and the value of the feed is increased more than enough to cover the expense. On land worth $30 per acre, and counting labor and wear and tear of equipment, it costs to raise an acre of wheat about as follows, hiring the labor done:

| | |
|---|---|
| Interest | $2 10 |
| Plowing | 1 00 |
| Harrowing | 20 |
| Seed | 50 |
| Drilling | 40 |
| Harvesting | 1 00 |
| Thrashing 10 bushels | 80 |
| Total | $6 00 |

This gives the cost of 10 bushels at 60 cents per bushel; 13 bushels, 44 cents; 20

bushels, 35 cents; 25 bushels, 29 cents; 30 bushels, 25 cents, and 35 bushels, 21 cents per bushel. The wheat straw is worth $1 per acre. I have fed wheat for three years, and now have the bulk of two crops on hand, and will feed the most of it. I can soak ground wheat three or four days in winter, and one or two days in summer, and realize $1 per bushel by feeding to 5-cent pork. In May of last year I began feeding 14 young pigs; gave them nothing but wheat, and at eight months old sold them, weighing 304 pounds each. Other pigs, with all the corn they wanted, were sold at 11 months, weighing 230 pounds each.

OTTAWA COUNTY.

*J. T. White, Ada.*—A large percentage of the wheat fed whole passes the animals unmasticated. Ground wheat is as healthful and nourishing as corn, and, when fed to hogs in the form of swill, it is 25 per cent. more fattening than corn, pound for pound. It is very satisfactory for growing hogs, but the meat from wheat-fattened hogs is not as solid as that from corn. Ground wheat is fed to work horses, and seems to maintain strength and flesh about as well as corn, when using but two-thirds the quantity. For milch cows, it is the best food known, being worth 40 per cent. more than corn at the same price. Wheat and corn are both selling here for 40 cents per bushel; and, if corn was selling at 30 cents, it would not pay the farmer to sell his wheat and buy corn to feed, hauling both ways; neither would it be any profit to him to sell wheat and buy bran or shorts at current prices, but he would improve the value of his feed fourfold by having the wheat ground at the public mills, costing only 4 or 5 cents per bushel. Counting interest on $20-per-acre land, with the wear and tear of equipment, and all labor, it costs about 72 cents per bushel to raise 10 bushels of wheat per acre; 15 bushels cost 52 cents; 20 bushels, 42 cents; 25 bushels, 35 cents; 30 bushels, 31 cents, and 35 bushels will cost 29 cents, put in the bin. Wheat straw is worth about 60 cents per acre. In fattening cattle, it is often very difficult to prevent them from scouring, when fed on corn or corn chop exclusively; by using one part of wheat and two parts of corn chop, this trouble is almost entirely obviated. I have known several hundred steers to be fed in this manner without the scouring of a single animal. Cattle feeders who have used wheat for two years think it is worth 60 cents per bushel for fattening cattle, selling them not lower than the present range of prices.

PAWNEE COUNTY.

*J. B. Brown, Larned.*—When fed whole, about 10 per cent. is voided without being masticated. Wheat appears to agree as well as corn with hogs; proves 10 per cent. more growthful. The flesh of the wheat-fed hog is not as solid as if made from corn alone, and the last three or four weeks of fattening, corn should be used alone. Wheat is fed, soaked, to work horses, and they thrive and fatten better than on corn, being fed about the same quantity. It is worth, in this market, 38 cents and corn 40 cents per bushel. If the wheat was selling for 40 cents and corn for 30 cents per bushel, it would be profitable for the farmer to sell his wheat and buy corn. At equal price per bushel, they will give about equal results, but 10 cents is too much difference for feeding purposes. The feeder would, in some instances, make a profit by exchanging his wheat at the near-by mills for shorts, at current prices. The public mills charge 8 cents per hundred for grinding wheat, but the improved quality of the feed will not warrant this expense. The estimate of the cost of raising an acre of wheat yielding 10 bushels is as follows:

| | |
|---|---|
| Plowing | $1 00 |
| Seed | 60 |
| Drilling | 30 |
| Cutting | 1 00 |
| Thrashing | 70 |
| Boarding | 20 |
| Interest on land worth $20 per acre | 1 40 |
| Total cost of raising 10 bushels | $5 20 |

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On this basis, 10 bushels cost approximately, 52 cents per bushel; 15 bushels cost 37 cents; 20 bushels, 29 cents; 25 bushels, 25 cents; 30 bushels, 22 cents; 35 bushels, 20 cents.

RUSSELL COUNTY.

*J. G. McKeen, Russell.*—Farmers of this county have fed about 15 per cent. of the small wheat crop of last year to farm animals. It has been ground, except where fed to poultry. Fed whole, about 25 per cent. passes the animals unmasticated. Wheat is healthful and, to some animals, as nourishing as corn, but, for hogs, it proves 20 per cent. less fattening, pound for pound, than corn. Leaving out the question of price, wheat is worth about as much as rye for feeding young hogs and pigs, if ground and fed in a slop. The pork from wheat-fed hogs is leaner, and not so oily. To fatten properly, hogs should be fed the last two months before marketing on corn or Kaffir corn. A good mixture for hogs is two parts wheat and one part corn or Kaffir corn. Equal parts of chopped wheat and oats or chopped corn, fed in quantities about three-fourths as much as of corn, make work horses thrive and keeps up their strength better than corn alone. Wheat is not as good as corn to keep up the flesh on work animals. Ground wheat is better than corn for milch cows. For feeding horses, it is worth about 30 per cent. more than corn, at the same price per bushel; for milch cows, it is worth 50 per cent. more; for other cattle, it is worth 40 per cent. more, if fed for growth, and 20 per cent. less if fed to fattening cattle. Wheat is selling for 40 cents and corn for 42 cents per bushel, which forces the farmers to feed the wheat. With corn at 30 cents per bushel, it would not be profitable to sell wheat and buy corn. At current prices, the mill should be very near by to make it profitable for a feeder to sell wheat and buy bran and shorts. The public mills charge 5 to 7 cents per bushel for grinding wheat, but the grinding can be done at home in less time than is required to haul the wheat to mill. Farmers use the "Blue Valley" and other sweep mills, and the expense of grinding at home or elsewhere is more than overbalanced by the good results. On wheat land worth $10 per acre, it costs about 45 cents per bushel to put 10 bushels per acre in the bin; 15 bushels, 37 cents; 20 bushels, 32 cents; 25 bushels, 26 cents; 30 bushels, 22 cents, and 35 bushels cost 21 cents per bushel. When wheat is drilled in among corn, the cost will be about $1.10 per acre less than the above. Straw is worth 20 cents per acre to sell and 50 cents to feed. To raise wheat solely for feed is not profitable, but at present prices it is better to feed than sell. I have always fed it when the price dropped below 50 cents, and it has paid well when it was profitable to feed any grain. Rye is a more certain crop, and as good feed for hogs, but not for milch cows. Should present prices continue, farmers must stop raising wheat unless they can feed it to live stock.

SEDGWICK COUNTY.

*C. H. Bardshar, Mount Hope.*—About 25 per cent. passes the animals unmasticated if fed whole. Wheat is more nourishing than corn for growing hogs or other young stock; but for matured animals it is better to mix with corn, oats, or bran. For a general hog feed, wheat is worth about 20 per cent. more than corn at the same price. The flesh from wheat-fattened hogs is fully equal to that made from corn. A mixture of ground wheat and corn with bran is a superior ration for horses; but wheat alone is not equal to oats. The wheat ration should be about three-fourths that usually fed of corn. Fed to cows, it increases the flow of milk, but not the yield of butter; neither is the grain of the butter considered quite as good. Wheat is worth the same as corn at the same price for feeding horses, and 10 per cent. more for milch cows. The market value here for corn is 35 cents, and wheat is 40 cents, at which it will not pay to sell the wheat. It would be profitable

for a feeder to sell wheat and buy bran and shorts to mix with ground wheat. The mills charge 5 cents per bushel for grinding, and it improves the value of the feed more than enough to pay that expense. Some farmers use the "Challenge" windmill and grinder, and the cost of grinding is reduced to a very small sum per bushel. Land is worth $30 per acre, and, counting interest, labor, and wear and tear, it costs about 65 cents to raise 10 bushels per acre of wheat and put it in the bin; 15 bushels per acre costs 46 cents; 20 bushels, 36 cents; 25 bushels, 30 cents; 30 bushels, 26 cents; 35 bushels, 21 cents per bushel. Straw is worth from 50 to 75 cents per acre for feed. I have fed about 1,500 bushels of wheat, and find that for fattening young hogs seven or eight bushels will go as far as 10 bushels of corn, and for feeding young pigs it gives still better results. I have fed 15 milch cows wheat and corn ground together, to which is always added bran, when I can buy at less than $18 per ton. I do not like wheat for work horses, except mixed with corn, oats, or bran.

SHAWNEE COUNTY.

*Thomas Buckman, Topeka.*—Wheat appears as healthful and nourishing as corn, but, when fed to hogs, is about 10 per cent. less fattening. Mixed and ground with corn, it is a superior food for brood sows and pigs. Horses do not thrive and fatten on it as they do on corn. Wheat is worth 45 cents and corn 30 cents per bushel, which would not suggest to the feeder any profit in feeding wheat. It might be profitable for the feeder to sell wheat and buy bran or shorts for feeding milch cows, but not for fattening purposes. The public mills charge 4 cents per bushel for grinding wheat into feed, and I have thrown aside our "Keystone" grinder and take the wheat to the public mills. On land worth $30 per acre, and counting interest, labor, and wear and tear of equipment, it costs here about $1 per bushel, in the bin, to raise 10 bushels of wheat per acre; 15 bushels, 70 cents; 20 bushels, 55 cents; 25 bushels, 46 cents; 30 bushels, 40 cents; and 35 bushels, 35 cents per bushel. Straw is worth $2.50 per acre. While wheat is a good feed for young and growing animals, the question now is, can we afford to raise wheat for feed when we can raise two bushels of corn as easily as one of wheat, the latter having no greater feeding value? For variety, had we not better buy bran to mix with chopped corn?

SHERMAN COUNTY.

*Enos Bowman, Goodland.*—A large portion of the wheat passes without mastication when fed whole. It is healthful and as nourishing as corn for young and growing stock, but, fed to hogs, proves 25 per cent. less fattening than corn, making 10 pounds of live pork per bushel, which has hardly as much lard as that from corn. Wheat is ground and mixed half and half with corn meal and fed to work horses, and maintains their strength and flesh as well as corn when fed the same amount. Fed to milch cows, wheat is better for milk than corn, but not so good for fattening purposes. It is 10 per cent. more valuable than corn, at the same price, for feeding milch cows, and for other cattle it is worth 10 per cent. less. Wheat is selling here for 45 cents and corn at 40 cents per bushel, at which there seems to be very little profit in feeding, and if the corn was 10 cents cheaper than wheat, it would be profitable to sell wheat and buy corn, hauling both ways. Bran and shorts are entirely too high to be bought by selling wheat at present prices, but it would be profitable to pay 7 cents per bushel for grinding wheat for feed. With land worth $10 per acre, it costs about 30 cents per bushel, in the bin, to raise 10 bushels of wheat per acre; 15 bushels, 25 cents; 20 bushels, 24 cents; 25 bushels, 23 cents; 30 bushels, 22 cents; 35 bushels, 20 cents. I raised a bunch of pigs on skim milk, bran, and shorts, and finished them on ground wheat, and at six months and six days old they averaged 250 pounds.

SUMNER COUNTY.

*T. A. Hubbard, Rome.*—About 20 per cent. passes unmasticated when fed whole; soaked or ground, it is found to be as nourishing and healthful as corn, but 10 per cent. less fattening for hogs. At the same price per bushel, if the wheat is ground, it is worth 10 per cent. more than corn as a grain for hogs. The pork from wheat-fed hogs is considered better than that made from corn, as it has a larger proportion of lean. Ground fine and fed as slop, it is much better for growing hogs and pigs, or other young stock, than corn. It might be used to better advantage by mixing two parts corn, two parts oats, and one of flax seed, and grinding together, fine. A small quantity of wheat has been fed alone to work horses, but has not given the satisfaction obtained by the use of corn or oats. Wheat sells here for 50 cents and corn for 42 cents; at such prices, it is better to feed than sell the wheat. Public mills are too likely to lose some of our sacks and take full toll from all that remains. The small cast-iron mills do not grind fine enough for good feed. Wheat land here is worth $35 per acre. Counting interest, wear and tear of equipment, and all expenses, it costs about $1 per bushel to bin 10 bushels of wheat per acre; 15 bushels, 67 cents; 20 bushels, 53 cents; 25 bushels, 46 cents; 30 bushels, 43 cents, and 35 bushels, 40 cents per bushel. Straw is worth 25 cents per acre. Wheat is the best of all feed for fowls.

WASHINGTON COUNTY.

*D. E. Ballard, Ballard's Falls.*—Considerable wheat has been fed, soaked or ground. It is as healthful and nourishing as corn; and, to hogs, proves much more fattening than corn, especially when mixed with corn and coarsely ground—chopped. In that form, it is very satisfactory for hogs and cattle. Wheat sells here for 40 cents and corn for 25 cents per bushel, at which prices the wheat is worth more for feed than for shipping. Chopped wheat fed with corn, half and half, is far more profitable to the feeder than selling wheat and buying bran or shorts at current prices. I use an iron-bur mill attached to the same windmill which does my pumping, and the grinding costs about 5 cents per bushel; this is more than overbalanced by the increased value of the feed. Computing interest, labor, and wear and tear of equipment, it costs about 90 cents per bushel, in the bin, to raise 10 bushels of wheat per acre; 15 bushels, 67 cents; 20 bushels, 50 cents; this is as high as we ever get in the scale of wheat yield. Sixteen bushels per acre, at a cost of 60 cents per bushel in the bin, is about what we have averaged for the past 10 years. Straw is worth about $1 per acre; I always consider that the straw just about evens up the cost, and wear and tear of the farm implements. Wheat is raised to rotate the crops, and that more corn may be raised. Wheat can be raised much cheaper on corn ground than elsewhere. In "finishing off" a bunch of cattle, I try to keep ear corn, shelled corn, oats and chopped feed (wheat and corn) in the feed boxes, from which they can help themselves to what they like, which is mostly the wheat-and-corn chop.

WILSON COUNTY.

*S. S. Benedict, Benedict.*—A fourth of the wheat fed whole passes undigested. For hogs six months old or over, it has about the same fattening value per pound as shelled corn, and a fair return per bushel is 15 pounds of live pork. At the same price per bushel, it is worth as much for old hogs as corn; for pigs, it is worth 50 per cent. more, and there is nothing better. It is fed to work animals, milch cows and other cattle with an equal quantity of either corn or oats, but is not especially better than either. At the present price, of 45 cents, and corn at 37 cents, the wheat can be more profitably used than sold, or exchanged for shorts or bran at current rates. The customary charge for grinding is five-eighths toll, or 5 cents per bushel, and the grinding makes it worth that much more, although the work can be done

with steam or horse power on the farm for 2 cents. The cost to raise, on land worth about $20 per acre, is, for a 10-bushel crop, 60 cents per bushel; 15 bushels, 45 cents; 20 bushels, 37 cents; 25 bushels, 30 cents; 30 bushels, 25 cents. My experience has been, that for young animals of all kinds, during the early growing period, when bone and muscle are desired instead of fat, wheat is most excellent; but to finish them for market, corn is yet king.

## THE SORGHUMS, FOR FORAGE AND GRAIN.

By F. C. BURTIS, State Agricultural College farm, Manhattan; before the Kansas State Board of Agriculture, at its twenty-fourth annual meeting, January 9–11, 1895.

The most extensive cultivation of the sorghums for fodder and grain, and their greatest value as such, is with the Western farmer in the drier districts, where the question confronts him as to what, taking one year with another, will yield a sure and profitable crop of fodder and grain. In endeavoring to find a plant that would fill the above requirements, the sorghums have been investigated and found to contain many valuable points as such, and the rapidly extending area planted to the sorghums every year goes to show that the farmers are realizing the value of this crop. It is true that this rapid increase has been in the last few years, and the question might be asked, Why have the people been so long to realize the value of sorghum for this purpose? I would answer by stating that it is only within the last few years that varieties of sorghums that produce large yields of grain and fodder have been introduced. The dry-weather-resisting qualities of sorghum were long ago demonstrated by its growth in the almost rainless districts of Asia and Africa.

Sorghum has an endless number of varieties, and a proper choice will be a long step toward success. Our experiment station has grown and tested over 200 so-called varieties. The seed of the greater number of these was furnished by the United States department of agriculture, collected in all parts of Africa and Asia. Most of these belong to the nonsaccharine group, and were grown with the object of fodder and grain. All but a few of these have been discarded as inferior sorts, and a list of a dozen will include all worthy of mention. It is the intention of this paper to give the points of difference of real importance to the farmer.

First, the varieties of sorghums are divided into two general groups, the saccharine and nonsaccharine. All varieties that contain sugar belong to the first-named group, and non-sugar bearing to the latter. Then I would mention that there are tall-growing and short-growing sorts; some with large, coarse stalks, and some with small, slender stalks. Some abound in foliage, and others have comparatively few leaves. With some, most of the leaves remain green until killed by frost, while with a few the leaves commence dying on the lower part of the stalk long before the grain is ripe. Some varieties will mature seed in the ordinary season of Kansas, but other large-growing varieties have been grown at our station that never reached near enough to maturity to head out.

In selecting, we would naturally pick for a large-growing variety, giving a large yield of feed per acre. The first objection to such a selection is, that such a variety hardly ever matures the seed and the yield of grain is not as large as the medium-growing kinds; the tall, heavy stalks are very difficult to handle, and farmers say they would rather grow the medium sorts and put up with a little less fodder than to have the last-named objection to deal with. Medium large stalks are desirable, as the slender ones lodge very easily and make the harvesting of the crop almost impossible. Some very large grain-producing sorts have been discarded at the station, because the stalks were too slender to stand up. The short-jointed stalks

should be selected, as they are stronger and carry many more leaves. The drying of the leaves on the lower part of the stalks is the objection to some of our nonsaccharine varieties. When the leaves die like this the rain bleaches them, and they are rendered worthless as feed, even if the wind has not already blown them away.

Again, there is a great variation in the form of the seed top. In one type it extends erect on the stalk, or may lean to one side a little, while in the other extreme it makes a short curve and hangs downward, and is termed goose necked. Some of these heads are very open and sprangling, others are long and slender, while in other types the heads are almost round or oval. The erect seed tops are the most desirable, as the goose necks tangle and make the crop very tedious to handle, unless the expensive practice of cutting off the heads while the stalks are standing is followed. Life is too short to bother with them while we have good varieties of the other type. The varieties that have the open and sprangling heads are small grain yielders, but a medium-compact seed top is the most desirable, as in some varieties they are so dense that the seed molds, and then stock do not eat it readily.

The seed of sorghum varies in color all the way from black to a snow white. In some cases the grain is quite soft, and in others it is hard and brittle; some thrash easily from the glumes, while others have to be fed with the glumes adhering; these contain a bitter and disagreeable taste. The black or dark-colored seed is said to contain bitter principles that the white does not, but the light brown or amber-colored grain is eaten as readily as the white. Birds, and especially English sparrows, are quite fond of sorghum seed as it is ripening, and seem to prefer the white, but any variety where the glumes do not cover the seed well is troubled by them. The soft grains might be preferable to the hard and brittle ones, but much stress should not be put on this point, as all the seed should be ground before being fed.

There is a difference of opinion as to which is the more valuable, the saccharine or the nonsaccharine sorhum, for a forage and grain crop. While we say that these are two different groups, they merge more or less into each other. There is a gradation from the extreme that the chemist picks out, where there is the highest per cent. of sugar, to a medium, where the stalks are quite juicy and may or may not contain a small per cent. of sugar, and then there is the other extreme where the stalks are filled with a dry pith. If the division line should be strictly drawn according to the name, some of our so-called nonsaccharine varieties would come under the other group, as some of them contain quite sweet juices. The best sugar varieties are small grain producers, when compared with our best nonsaccharine varieties. Where such a variety as Kansas orange will yield 20 to 30 bushels of grain per acre, red Kaffir corn will yield 40 to 50.

For stock feed there is no difference in the value of the grain of the two. As to the fodder of these two, the yield of the first named is generally from one-half to one-third the more. If fed properly, all the stalks of a saccharine variety will be eaten, and the same is about equally true of the fodder of the red Kaffir corn; but of many nonsaccharine varieties, the stalks are so dry and hard that stock will eat but little of them. Some of the large-growing, nonsaccharine varieties, as white Milo maize, will yield as much fodder as the sugar-bearing kinds, but the large yield of sugar that an acre of such a variety as Kansas orange would produce has considerable feeding value. On poor soil, the nonsaccharine varieties will do the best, especially in yield of grain. Opinions conflict as to which of these classes stands dry weather best. I think them about equal in this respect. The stalks of most of the sugar canes are so slender or weak that they lodge easily, and this is especially true when they are planted thick enough to give their largest yield of grain.

Of all varieties tested at the experiment station, the following list includes those that have given the largest yields of grain or fodder, with a minimum number of

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KAFFIR CORN.

JERUSALEM CORN.

objectionable points named above: Early amber, Kansas orange or white African should be selected, if great value is put on the saccharine element. They are not the largest producers, but mature in an ordinary season, and the grain is suitable for stock. Early amber is the smallest yielder of the three, but is extra early, and tillers well. The white African produces white seed, but it is covered with black glumes; consequently the birds do not molest it.

In the nonsaccharine varieties, types differ widely. Jerusalem rice corn has rather short, somewhat slender stalks, with limited foliage, and the stalks contain a dry pith. The seed top is large, and hangs on a short goose neck. The seeds are white, very large, and more or less sweet, and considerably softer than in any of the other varieties. This variety ripens extra early, and generally gives a large yield of grain, but the English sparrow has always harvested over half of the crop for us. Of the fodder, all but the leaves is about worthless. This variety has been well known for a number of years. Egyptian rice corn does not differ materially from Jerusalem corn in growth or results. These grow in height from 3½ to 5 feet.

White Milo maize is a tall, vigorous growing sort, with large, strong, juicy and sweet stalks, well covered with leaves. The heads are large and slender, grow erect, in compact panicles, and contain large white seeds. Kansas seasons are generally too short for this to mature seed, but in some seasons the yield of grain has been large. Where only a large yield of fodder is wanted, it answers the purpose well

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and compares well with the saccharine varieties in yield. In the season of 1889, it produced 15 tons of dry fodder per acre and 57 bushels of grain.

Brown Durra, sometimes called yellow Milo maize, is a variety very similar to white Milo maize in growth of the stalks, but the seed top is short and thick and hangs on a goose neck, and the grain is a light yellow. On good soil and in a good season the yield of fodder is very large, but the seed matures even later than the above variety, so as a grain producer it is of little consequence.

White Kaffir corn is one of the early introduced varieties of the nonsaccharine sorts. The plant grows short and stalky, and has short joints covered with large and numerous leaves. At maturity, the stalks are quite dry and pithy. The seed tops grow erect, are long and slender, and bear white seed. If dry weather checks this variety, the seed tops do not push out of the sheath, and the lower parts molds and the grain is worthless. Under ordinary conditions, this variety yields from 40 to 50 bushels of grain per acre and a fair yield of fodder, but the stalks are mostly refused by stock.

Red Kaffir corn was introduced at our experiment station in 1889 from the United States department of agriculture. It differs from the white in the fodder, in that it grows taller and more slender and is much more juicy, and sweeter. The seed differs in color, and is some smaller and harder. At the station it outyields the white in grain and fodder, and matures some earlier, and we consider it superior in all respects. Of all varieties, red Kaffir corn is the most valuable for farmers in general. It combines a large yield of fodder with the largest yield of grain, and is of a growth suitable to economical harvesting. Stock eat the fodder with a relish, and the feeding value of the grain is excelled by none. It stands dry weather as well, and does better on poor soil than any other. But it will respond well to good soil and plenty of moisture. After a variety has been selected, an important point is to keep it pure, which will take some care if several kinds are raised in the same field. Sorghums cross fertilize quite readily, and promiscuous crossing deteriorates the variety. The crop responds quickly in improvement by selection of seed. Select large, well-formed seed tops, and a year or two will show an improvement.

The cultivation of sorghum is very much like that of corn, but the characteristics of the plant admit of some different methods, and in some respects require different treatment. Sorghum is a semitropical plant, and requires warm weather to develop it. The mistake is often made of planting too early. Before or not later than corn was the practice a few years ago. Generally, the result of this was a very poor stand, and what plants came up made a very slow growth, and the weeds and grass choked them out. The seed should never be planted until the ground is thoroughly warm, as at the best the seed is quite delicate to germinate. Kaffir corn has received the name of being more so than the common sorghums. I have seen it planted the middle of May, and followed by a heavy, cold rain, and less than 10 per cent. of the seed came up. Seed from the same bin, planted in the same way over three weeks later, gave an excellent stand and matured an excellent crop before frost. Shallow planting will help the germination much; half as deep as for corn is a good depth. The early growth is very slow and the plants tender; hence the necessity of having the ground free from weeds at time of planting.

A great advantage of the sorghums over corn for forage is that they admit of close planting. Corn cannot be sowed with good results. The growth of the foliage is too dense and makes the plants watery, and will contain little nutriment. Besides, it lodges very easily when planted this way, and dry weather will kill it very quickly. On the other hand, sorghums will admit of close drilling and produce a full grain crop, and, with thick seeding, will make excellent hay. As a hay crop, a yield of two to four tons per acre is not unusual. For this, the quantity of seed

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sown per acre should be varied some, to suit the conditions, but, in most cases, if broadcasted, one bushel will be sufficient, and if drilled, three pecks. Put on enough seed to make the plants small and fine; the yield will be about as much, and can be handled much easier and better. The best plan is to plant thick enough to make good, fine hay, without any thought of the grain.

If grain is wanted, drill the rows far enough apart to admit of cultivation, so as to produce the largest yield of grain. At the experiment station, we find, to give the maximum yield of grain, the rows should be no further apart than three feet, and may be as close as 2½, and the stalks should be from four to six inches apart in the row. The above applies more closely to such a variety as red Kaffir corn, as in rich soil some of the ranker-growing sorts will lodge when planted this close.

Cut and shock as corn. Special care must be taken, as the heavy seed tops have a great tendency to twist the shocks down. Make large shocks and tie well at the top. If they stand well, they may be left in the field until wanted for use, although the better way is to haul and stack in ricks. The stacking is much better for a saccharine variety, as it will not freeze and thaw and dry out so much. Some go to the trouble to cover sufficiently with straw in order that it will not freeze, but this is not necessary if it does not freeze and thaw and is kept dry. It will keep well and be relished by stock until spring rains and thaws come on.

The question of harvesting the grain of the sorghum crop has always been a problem. The general practice has been to feed the grain and fodder without separating. This is wasteful, as little good is realized from the seed without grinding, and the proportion of grain to fodder is too great for general feeding. As to Kaffir corn, the problem has been solved. After the fodder has cured well in shock it may be run through a thrashing machine and the grain separated, as well as is wheat. The grain does not crack as badly in thrashing this way as when the heads have been separated first. The fodder comes through in a more or less broken condition, and should be stacked in a rick and covered with something to shed rain. This operation is not well suited to the very juicy varieties, and I am doubtful of it being advisable, but have heard of an instance or two where it has been done. Where the thrasher cannot be used, the next best method that I know of is to load the stalks on a hay rack, with the heads extending over the edge, so that they can be cut off with a hay or corn knife. At first thought this may seem like considerable trouble, but the fodder may be put on as fast as you would load, for it is not necessary to get every head, and some may be cut off quite long. A binding pole will hold the fodder in place while the heads are being cut off. The seed can then be thrashed or flailed.

To harvest sorghum hay and keep it sweet and bright requires judgment and care. No fixed rules can be laid down for this, and it must be governed by the weather and other conditions. In our ordinary fall weather, if the crop is not too heavy, it will cure sufficiently in two or three days after cutting so that it can be cocked. If the leaves are dry, the juice in the stalk will keep. At first, at any rate, the cocks should not be large, and should be well raked down to shed rain. After standing in the cock a week or 10 days, it may be hauled and stacked. The stack should be covered with some material that will turn water.

In comparing sorghum with other crops, the one great claim is that it endures dry weather so much better. While it will not grow without moisture any more than other plants, its numerous and deep-set roots enable it to tide over a dry season disastrous to other crops, and when rain comes it will take a new start and produce a fair crop of fodder, if not grain and fodder. With corn, there may be sufficient water in the soil to make the crop, and even then hot winds for a few days can materially injure it, if not entirely kill the tassels and make a grain failure; sorghum

under the same conditions, will suffer but little. One great drawback to the making of a first-class quality of corn fodder this far west is, that most of the leaves are dried up and blown away before the crop can be cut without a large shrinkage in the grain. On the other hand, sorghum leaves are green and flourish after the seed is ripe. My comparisons are limited to corn mostly, as these two plants are similar in growth. Red Kaffir corn is suggested now as a substitute for corn. The table on the following page will show the comparative results of these two crops for the last six years on the college farm:

| YEAR. | RED KAFFIR CORN. | | CORN. | |
|---|---|---|---|---|
| | *Grain per acre. Bushels.* | *Stover per acre. Tons.* | *Grain per acre. Bushels.* | *Stover per acre. Tons.* |
| 1889 | 71.00 | 9.00 | 56.00 | 2.50 |
| 1890 | 19.00 | 4.20 | 22.00 | 2.50 |
| 1891 | 98.00 | 6.00 | 74.00 | 2.75 |
| 1892 | 50.00 | 5.00 | 30.00 | 4.55 |
| 1893 | 49.00 | 5.25 | 30.00 | 1.75 |
| 1894 | 00.00 | 2.00 | 00.00 | 1.00 |
| Averages, | *57.40 | 5.29 | *42.40 | 2.50 |

*Average of five years.

In but one case does the corn yield more than the Kaffir corn, and that is in grain in 1890. This was due to an early frost, September 12, that killed the Kaffir corn just as most of the seed was in the milk, and it made nothing but chaff. The corn was also injured. The yield of stover in 1894 is small in both cases, and the grain a total failure. An appreciable rain did not fall between the middle of July and the 1st of September. The corn grew side by side on alternate plats. They had the disadvantage of being in poor soil underlaid with hardpan. Both were planted on May 15. The corn showed the effects of the dry weather first, and by the middle of August was entirely dead. The tasseling had only partly taken place. The Kaffir corn remained green, but the growth was checked. After the fall rains came on, the growth started up some and a few heads appeared, but were blighted. The table shows the yield of the Kaffir corn stover to be double that of the corn in this case; but all the difference in value is not shown there. Numerous investigations prove that the per cent. of digestible dry matter in corn fodder so immature is much less than when the crop is mature. The feeder recognizes this fact, and the general complaint this winter is, how much fodder the stock eat, and how little good it does them. The dry weather kills the corn, and then it must be cut, but the sorghum lives on; although the growth may be checked, the crop matures.

Two tons of Kaffir corn stover may seem like a small yield, but, for the same reason that caused the small yield, the tame grass crop was a total failure with us in most cases, and prairie hay did not yield over half a ton per acre, and it had the benefit of fall rains. The stover from corn and sorghum do not differ materially in composition or digestibility, but in the palatability there is a great difference. How easily a crop may be utilized for feed is an important point in its value. The following applies to corn stover in central Kansas: At our experiment station, cutting up corn stover with the common straight-cut machines does not induce the stock to eat the stalks much better than when the stalks are fed whole. When fed cut up and in mangers, there is a waste of from 30 to 40 per cent., which is refused. Fed whole on the ground, there is a waste of from 50 to 60 per cent. Sorghum, on the other hand, with no preparation, will all be eaten up, and the stalks are the desirable parts. As to the grain, the corn is the most desirable for utilization as feed,

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being larger and usually softer, and may be fed with excellent results without grinding. Sorghum seed is hard and small, and must be ground or soaked for the best results. Corn and sorghum alike furnish food rich in digestible carbohydrates, fat-forming foods, and should be fed in connection with some food rich in nitrogen, as alfalfa, especially if fed to growing animals.

As to second-growth sorghum killing cattle: I do not take up this subject because I have any additional information to what Secretary Coburn has already published, but a paper on sorghum for forage would not be complete without mention of this point. The facts of the case are, that second-growth sorghum sometimes kills cattle and sometimes does not; and that in some cases a very small quantity, a handful or two, will kill them about as quick as strychnine. A few years ago these casualties were few and little heard of, but during the past summer many have been reported. In 1893, a case was given in the *Breeders' Gazette* of sudden killing of cattle by eating second-growth sorghum, and the editors asked for more experience in this line, and only two more cases were reported. Last year there was more second-growth sorghum than usual. The dry weather stopped the growth, and in many localities the crop was cut, and, when the rains came in September, there was a rank second growth. At first, when reports came out, it was said that the killing was probably due to hungry cattle unaccustomed to green feed being turned into second-growth sorghum and allowed to eat all they wanted. But cases are on record where a few handfuls have killed well-fed cattle. Regent Goodyear, of our agricultural college, relates a case near his home. A bull and some cows were being pastured near a patch of second growth sorghum, and separated from it by a temporary fence, with a boy to guard that they did not go through. The bull went through the fence and had taken a few mouthfuls before the boy could get him out. The bull died in a half hour.

At first it was thought that the danger was only in common sorghums, but second-growth Kaffir corn has proved equally dangerous. What it is about sorghum that has this deadly effect is not known yet. In most cases where fatal results have occurred it has been from eating the green plant. But our Doctor Mayo has a case reported to him where the cured fodder had the same effect. Some of the fodder was procured, and the case is under investigation at the present time. In the face of all this, we hear of farmers who have raised sorghums for forage 10, 15 and 20 years, and often pastured the second growth and had no bad results; and many cut two or three crops of sorghum hay in a season from the same plants and consider it the best of feed. While my advice is, be very careful with second-growth sorghum, I would at the same time urge our farmers to plant more rather than less acres of sorghum and red Kaffir corn.

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DISCUSSION.

MR. WHEELER: Have you ever raised Jerusalem corn on the college farm?

MR. BURTIS: Yes; side by side with other varieties.

MR. WHEELER: What is the difference between that and the red Kaffir corn?

MR. BURTIS: It is earlier; it has white seed; but the stalks are dry. The stalks of the other are juicy.

MR. COLLINS: When red Kaffir corn is cut and shocked, how long would you leave it in the shock before it will be ready to run through a thrashing machine?

MR. BURTIS: Until the last of December or the first of January. That has been our practice at the college. About two months.

MR. COLLINS: If the Kaffir corn is put in shocks, and stands to cure, will not birds destroy much of the seed?

MR. BURTIS: They will.

A DELEGATE: Will seed keep if it is put in a granary which is deep?

MR. BURTIS: It will.

A DELEGATE: Have you any experiments showing the cost of producing so much of the seed from the grain?

MR. BURTIS: We have not; but anyone who is accustomed to raise any farm crop could easily figure one out.

MR. COLLINS: Have you any other method than that mentioned for removing the heads from Kaffir corn?

MR. BURTIS: No.

MR. COLLINS: Will the heads heat and damage if put in large heaps?

MR. BURTIS: Not if thoroughly cured.

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## RAISING, HARVESTING AND MARKETING POTATOES.

By STATE SENATOR EDWIN TAYLOR, Edwardsville; before the Kansas State Board of Agriculture, at its twenty-fourth annual meeting, January 9-11, 1895.

Growing potatoes is a very common diversion. Nearly everybody with a garden has indulged in it to some extent. Potatoes are of more value to the world than any other vegetable. They are well named "the poor man's necessity and the rich man's luxury."

The most important factor in potato growing is the soil. A rich, sandy loam is best. Bottom land is commonly preferred, both because of its fertility and its friability. Where fertility is lacking in soil, it may ordinarily be supplied artificially. The two great sources of artificial fertility are the fertilizer factory and the "beef factory." Some potato growers report large profits from the use of commercial manures. I have used several of the leading brands of manufactured fertilizers (including the Mapes, Bradley, Coe, and Armour), in ton and half-ton lots, uniformly at a loss. The best result I ever obtained was from a half a ton of Armour's manufacture, this summer.

In this case, the product of approximately one acre of potatoes fertilized with one-half ton of Armour's potato manure was carefully weighed and compared with the product of an equal-sized plat not fertilized. The result of the comparison showed an increased yield from the fertilized acre of 130 pounds of potatoes. Assuming them to be worth 50 cents per bushel, the manure returned $2.18 per ton against a first cost at the factory of about $22 per ton, showing a loss of $19.81 per ton, besides freight and labor of application. Neither the Bradley, Mapes nor Coe fertilizers did any good in my field. But whenever I have applied "beef factory" refuse, the good effects have been apparent without the test of measure or scales. The manure made from feeding 126 head of steers a trifle over 100 days and 90 head of heifers about 50 days was spread upon 30 acres of potato ground, day by day, as it came from the sheds, and plowed under in the spring. The increase in yield, as shown by careful comparison with unmanured ground lying alongside, was 60 bushels per acre. Figuring these potatoes, also, at 50 cents per bushel, the profit, not counting labor of application, was $30 per acre, or $900 on the field. I assume that enough virtue from the manure remained in the ground after the first crop was removed to pay for handling and spreading manure, and that the increase in the first crop was clear gain. I have read that barnyard manure makes potatoes scabby and rough. With me, the reverse has been observed, namely, that where so manured they were smoother and brighter than on unmanured portions of the same field.

My rotation has been, in the main, first year, potatoes; second year, potatoes;

third year potatoes; and then potatoes *ad libitum*. It is a rotation which the best of soils will ultimately repudiate. While continuing it I have tried in several ways to break its severity. Where the potatoes are dug early I sow either oats or turnips. Oats planted in August will make a dense growth of top before cold weather. My custom has been to plow them under in November. The result on the succeeding crop of potatoes is very satisfactory. Turnips are supposed by the chemist to draw on the same elemental fertility as potatoes, and should injure the succeeding crop. In this particular, as in many others, the chemist is corrected by the bookkeeper. Instead of turnips impoverishing the soil for potatoes they greatly improve the succeeding crop. I don't know "why;" I don't much care. Should crimson clover do well with us, I shall expect great things of it, because the time for sowing it is after early potatoes are dug, and it will be ready to turn under in the following summer in time for planting late potatoes on the sod. Perhaps, in this way, we can feed the soil and work it at the same time.

In Colorado, they plant potatoes on alfalfa ground with excellent results. In some way, whether by plowing under clover or alfalfa, or by the use of barnyard manure, or by the use of manufactured fertilizer, we must raise the per-acre yield of potatoes in the state of Kansas. In the era of low prices, which is plainly upon us, that is the only way to get a profit out of the crop.

It is likely that many soils would not be benefited by fall plowing. I think there is no question but that our "bottom" lands, in Wyandotte county at least, are improved for potatoes by plowing in the fall. This does not take the place of spring plowing at all. To many it would seem like labor worse than wasted; but the fact that it is almost universal among us shows that there is something in it. In general terms, I think it safe to say that anything which makes the soil finer helps the potato crop. Fall plowing notably assists in this.

The second consideration in potato growing is water. Potatoes are thirsty, particularly during the development of the tubers. Thrice and four times happy is the potato man who, like his brother in the state of Washington, makes his crop in a district of assured humidity, or else in irrigated lands where, having plenty of water at command, he can count the constant sun as working for him instead of against him. In a variable climate like eastern Kansas, he must supplement such deficiencies of rainfall as may occur with fertility, careful cultivation, strong seed, by planting as early as possible or decidedly late, and, in some cases, by planting under straw.

The third essential in point of importance in potato growing is the seed. That should be crisp and unsprouted. If buried, potatoes must be covered lightly at first, and the covering added from time to time, but only enough to protect the tubers from frost. This is the most unsatisfactory and expensive way of storing potatoes. The next worse way is a cellar under a building. The most satisfactory and the cheapest way that I know of is to store in a dugout. In most of our Kansas soils, no walls but the dirt walls are needed. The roof will be of earth over poles and brush. In wet weather such a roof will leak, unless covered with boards, cornstalks, straw, or other covering. The best location will be a slope or bank facing south. By leaving an alley through the center of a dugout, with plenty of large ventilator shafts through the roof, a brisk circulation will be set up whenever the door in the end is opened—particularly where the door opens on the level, as it will if the building is dug in the side of a bank. The trouble with a cellar under a building is to give it air enough and keep it cool enough.

The dugout should be built with a bin on each side of a central alley. The bottom of the bins should be raised six inches from the ground. Both the bottom and sides are best made of fence boards, with inch spaces between. The sides of the

bins should be clear of contact with the walls, whether stone or dirt. Spouts should be placed at intervals through the roof near the outside of the bins, through which to pour down the potatoes into the cellar.

Such a building, carefully managed as to ventilation, opened up on frosty nights and kept closed during the warm days of fall and early winter, will take Early Ohio potatoes through to spring without a sprout. Early Rose, Beauty of Hebron, and such varieties may require turning over once. The only antidote for sprouting, aside from the manner of storage, that I know of, is the scoop shovel. Potatoes may be kept in cold storage till August without a sprout. If taken out and planted then they will yield a crop which makes superior seed. I have not been able to detect any difference between it and second-crop seed, by which is commonly meant potatoes grown as a fall crop from seed raised that season.

The question of second-crop seed and northern seed is very important. In the South, the second crop is raised without much difficulty. With us it is hard to get the sets to sprout. I think there is no doubt about the superiority for seed of potatoes that are in full vigor of growing when killed by frost. Whether grown as a second crop in the South or a first crop in northern Dakota or from cold-storage seed planted in Kansas, I suspect does not matter much. What seems to be the important factor is, that growth shall have been arrested by frost when the potatoes are in greatest vigor, leaving the tubers full of stored energy with which to begin again, instead of having already started on the road to decay. Second-crop seed sends up a larger stalk than first crop; it makes fewer sprouts; it is a few days longer in coming up in spring; it gives a heavier growth of vines; contrary to what is often printed, the date of ripening is delayed. Instead of second-crop seed coming in earlier than first crop, it comes in later (in my experience, fully 10 days), and the yield is often doubled. I never knew of its being less.

Better results will ordinarily be secured from cutting seed potatoes as they are used than from cutting them in advance. Where cut in advance, they may be spread out thinly and the cuts will dry up, or they may be dried up by plaster (gypsum), or they may be thoroughly mixed with dirt. The cutting I prefer to have done by hand. An active boy or girl, after two or three days' practice, will cut 20 bushels per day. It takes a smart man to cut 40 bushels of potatoes per day with a machine. I prefer to have large potatoes cut to single eyes. I have thoroughly tried Mr. Greiner's plan of planting whole potatoes, both large and small, and am decidedly of the opinion that, although it has a distinguished advocate, under our conditions it will not do.

Where potatoes are planted 13 inches apart in the drills, with rows 32 inches apart, about eight bushels of seed potatoes, if cut to single eyes, will be required to the acre. From 32 to 36 inches is the best distance apart for potato rows, in my estimation; and after much experimenting upon the distance between plants, ranging from four inches to two feet, I have settled upon eight pickers for the Aspinwall planter, which puts the sets 13 inches apart in the row.

In planting potatoes, one of the most important details is depth. From three to four inches is our usual depth. The "trench system," so called, has never given as good results, with me, as shallow planting. The *Rural New Yorker* lays less stress upon it than formerly. Its inventor, Mr. Alfred Ross, deceased, of Penn Yan, N. Y., claimed for it great things. He obtained some remarkable yields — in more than one instance over 1,000 bushels to the acre — and he considered that his method of planting was one of the great features in his success. His plan was to mark out eight inches deep, fill up the furrow two inches with mellow soil, drop the seed upon this bed, cover lightly, and, as the plant grew, to fill the trench up gradually. I have never been able to approach his yield of 1,000 bushels to the acre; a trifle