

EXPERIMENT STATION

IOWA STATE COLLEGE OF AGRICULTURE
AND THE MECHANIC ARTS

AMES, IOWA



CHICAGO & NORTH-WESTERN FREIGHT TRAIN LEAVING ODEBOLT, IOWA, FOR
CHICAGO WITH 220 HEAD OF STEERS FED ON THE FARM OF A. E.
COOK BY THE IOWA EXPERIMENT STATION

Condimental Foods (Stock Foods), the By-Products of
Corn, Flaxseed and Cottonseed, and Dried Blood;
Their Value When Fed in Conjunction
with Corn for the Economical
Production of Beef

PRESS OF THE AMES TIMES
AMES, IOWA

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INTRODUCTORY

This bulletin is designed to be of service to the cattle feeders of the middle west. For several years past this station has been in receipt of many inquiries concerning the feeding value, and advisability of using the by-products and condimental foods included in this test. This experiment conducted on the Brookmont Farms, owned by Mr. A. E. Cook, of Odebolt, Iowa, grew out of a visit of Mr. Cook to the experiment station last year in quest of information pertaining to this subject. The experiment station, and the feeders of Iowa, have been fortunate in securing the facilities furnished by Brookmont Farms for conducting this investigation. These results are not deemed final or conclusive but are presented as data bearing on a most important subject of vital interest to many feeders who have desired the information without waiting for the completion of further tests. Arrangements have been made for the duplication of this work during the coming winter.

August 1st, 1902.

C. F. CURTISS,
Director.

The Results of a Cattle Feeding Test

Conducted on Brookmont Farms, Odebolt, Iowa, to Determine the Value of Condimental Foods (Stock Foods), the By-Products of Corn, Flaxseed and Cottonseed, and Dried Blood, when Fed in Conjunction with Corn; also as to the Advisability of Changing Cattle on a Full Grain Ration From Dry Feed to Grass

1. Oil Meal and Corn versus Corn.
2. Cottonseed Meal and Corn versus Corn.
3. Gluten Meal and Corn versus Corn.
4. Buffalo Gluten Feed and Corn versus Corn.
5. Germ Oil Meal and Corn versus Corn.
6. Dried Blood and Corn versus Corn.
7. Iowa Stock Food and Corn versus Corn.
8. International Stock Food and Corn versus Corn.
9. Standard Stock Food and Corn versus Corn.
10. Corn and Dry Feed versus Corn and Grass.

W. J. KENNEDY

F. R. MARSHALL

The problem of most vital importance to the cattle feeder of the middle west at the present day is, how to produce beef more economically. The marked advance in the value of farm lands and the strenuous competition of the range territory coupled with the high priced feeding-stuffs have materially changed conditions from what they were less than two decades ago. Can he afford to feed fifty-five or sixty cent corn to cattle and hope to realize a profit? Can he, by the addition of some by-product or condimental food, secure better returns from the corn fed? These have been during the past year and are at the present day, very perplexing problems to the feeder. He has heard it stated that some of the by-products of corn, flaxseed or cottonseed when fed with corn will give much better returns than corn alone. He has been informed by the "stock food man" that a little stock food fed in conjunction with corn will increase his returns from fifty to one hundred per cent., this being due to the fact that the stock food has the power of increasing the appetite of the animal also of stimulating the digestive organs to such an extent that a much larger proportion of the corn con-

sumed by the animal is digested. During the last four months of last year, the Animal Husbandry Department received hundreds of letters from cattle feeders throughout the corn belt states, requesting information as to the advisability of feeding condimental foods or "stock foods" as they are more commonly known. Many of the letters read about as follows: "Which stock food gave the best results at your Station? The agent for the stock food claims that theirs gave the best results and that you recommend it." We always replied, stating that we had never conducted any experiments with stock foods at our Station, thus could not recommend any one brand over another. At nearly every state institute meeting, stock breeder's convention or county farmer's institute, the stock food question came up for discussion. At most conventions there were those present who championed the stock foods, while there were those present who condemned the use of the same. An investigation in most cases revealed the fact that most of the claims were made on generalities, as in most instances one farmer fed stock food while his neighbor across the way did not, else the farmer had fed stock food one year and compared his results with those obtained the year before when he had not fed any. Data secured in this way is of little or no value and proves but little or nothing so far as the merits of the food are concerned. In such cases the kind of cattle are not considered, nor is the skill of the feeder, which is an important factor.

Realizing the necessity of securing reliable data pertaining to the value of stock foods and the by-products of corn, flaxseed and cottonseed when fed in conjunction with corn, we decided to plan and conduct an experiment which would as nearly coincide with cattle feeding as conducted throughout the state so far as feed-yards, shelter, cattle, etc. were concerned as we could possibly make it. In other words, we aimed to conduct a feeding test under average farm conditions, using nothing but what every Iowa farmer could employ in his feeding operations. We decided that at least twenty animals should be used in each group in order to overcome the individual influence of the animal on the results.

It is the field of the Experiment Station to undertake work of this kind and the people look to it for information

along these and numerous other lines of work. To initiate the work we had in mind would take more money than the Animal Husbandry department had received for livestock feeding experiments during the past five years. There was but one way out of it which was to interest some large feeder in the work and induce him to furnish the cattle, corn and roughage on condition that we would furnish the by-products, do the feeding, superintend the entire work and give the results to the public. About this time the writers met Albert E. Cook, proprietor of the Brookmont Farms which comprise over seven thousand acres and are located near Odebolt, Sac county, in the northwestern part of Iowa. Mr. Cook, being a progressive man, ever on the alert to aid any work which would in any way be helpful to the farmer, offered at once to cooperate with us and aid us in any way within his power to bring the work to a successful termination. He turned over his entire farms and feed lots to us and said that we might select those best suited to our needs for the work in question. Eleven feed lots on three different farms as nearly equally distant as possible from the stock yards where the monthly weighings were made were selected. Each lot was supplied with water, shelter, etc., the conditions being as uniform as it was possible to make them. At this time Mr. Cook was feeding over seven hundred head of three year old, western cattle, purchased by him early in the season from Bartlett, Richards & Company, Nebraska. The cattle were of just fair quality, hardly up to the average of those fed throughout the state, and at this time were on about half a grain feed and had access to the stalk fields. Out of the seven hundred head, two hundred and twenty animals of as uniform quality, size and conformation as was possible to secure were selected. These were again subdivided as evenly as possible into eleven lots of twenty each. Each lot contained one grade Hereford, four grade Angus and fifteen grade Short-horns. They were assigned to various yards and put on preliminary feed for a period of three weeks before the regular feed test was commenced. At the beginning of the feeding test they were weighed for three days in succession at the same time and under the same conditions each day, the average of the three weights being taken

as the commencement weight. They were weighed every twenty-eight days until the experiment was concluded.

In assigning the various lots of cattle for the different kinds of feed we used a number system and drew for lots, thus eliminating any strife as to which company should have any of the various lots, our object being to make the lots as nearly even as was possible to divide them without regard to which ration they were to be fed.

The by-products of corn, flaxseed and cottonseed, the dried blood and the various stock foods were all donated by the respective companies which manufacture them. Samples of the feed furnished were analyzed and the results compared with samples of the same feeds sold to feeders.

The oil meal used was old process oil meal, furnished by the Midland Linseed Oil Company, Minneapolis, Minnesota. The Cottonseed Meal was furnished by the American Cotton Oil Company, Chicago, Illinois. The Gluten Meal, Buffalo Gluten Feed and Germ Oil Meal were furnished by the Glucose Sugar Refining Company, Chicago, Ill. The Dried Blood was furnished by Swift & Company, Union Stock Yards, Chicago, Ill. The Iowa Stock Food was furnished by the Iowa Stock Food Company, Jefferson, Iowa, the International Stock Food by the International Stock Food Company, Minneapolis, Minnesota, and the Standard Stock Food by F. E. Sanborn Company, Omaha, Nebraska.

We received a large number of requests from stock food companies all over the country, asking that they be admitted. It was impossible for us to test more than three. The selection was made without any discrimination in favor of or against any firm. Each company had the privilege of saying exactly how its food should be fed, our object being to give each and every firm the best possible chance. The only restrictions were that they should all feed the same kind of grain and roughage. This we had to insist upon in order that we might have the same conditions prevailing with each lot.

For grain, at the beginning we fed snapped corn, followed by shelled corn, then corn and cob meal, while corn meal was used during the last few weeks. For roughage wheat straw was used throughout the entire period. The

feeding trial lasted for ninety-four (94) days, but the cattle, as previously stated, had been on about half a grain feed for some months before the trial began.

The feeding was done by R. J. Kinzer, a graduate of our college and one of the boys who won the Spoor trophy and a large share of the class prizes at the student judging contest at the International Live Stock Exposition, Chicago, in 1901, in competition with students of the leading agricultural colleges of the United States and Canada.

The cattle were gradually brought to full feed. It took over five weeks to do this. This is a point which every feeder should observe very carefully. Some of the feeds used are doubtless new to many people, thus a few words of explanation will not be out of place.

OIL MEAL, OLD PROCESS.

At the oil mills after the flaxseed is crushed there are two ways of removing the oil. The first, known as the old process, consists of crushed flaxseed heated and placed in sacks which are piled one on another and the mass subjected to hydraulic pressure to extract the oil. After the oil has been pressed out, the residue, after it is stripped of its coverings appears in the form of slabs about one inch thick, one foot wide, and two feet long. In this form it is shipped abroad as it is then in its purest form and contains no adulterations. In this country it is usually ground up and sold in the form of meal, known as old process oil meal. The new process oil meal has been treated in a different way by the use of chemicals and steam, and contains about the same amount of digestible protein and carbohydrates but not nearly so much fat, thus is not so valuable for feeding purposes. A simple test is distinguish old process from new process oil meal as outlined by Professor Woll is as follows: "Pulverize a small quantity of the meal and put a level tablespoonful of it in a tumbler; then add ten tablespoonfuls of boiling hot water to the meal, stir thoroughly and leave to settle. If the meal is new process meal it will settle in the course of an hour and will leave about half of the water clear on top, Old process meal will remain jelly like."

COTTONSEED MEAL.

Cottonseed meal is a by-product of the cotton seed after the oil has been taken out of it. At the oil mill the envelope of the cotton seed is cut by machinery in such a way that the oily kernels are freed from it. The seed envelopes are known as cotton seed hulls. The oily kernels, separated from the hulls, are crushed, heated, placed between cloths or sacks and subjected to hydraulic pressure to remove the oil. The residue is a yellowish, board-like cake about one inch thick, one foot wide and two feet long. In this form it is shipped abroad as cotton cake. In this country the cake is reduced to meal by grinding, and shipped in sacks the same as oil meal.

GLUTEN MEAL.

Gluten meal is a by-product of corn, produced in the glucose factories in the manufacture of starch. It is difficult to secure detailed information as to the various steps employed in the manufacture of these products, due to the fact that the owners of these factories prefer to withhold some things from the public. The following points in regard to the preparation of the same may be of interest to feeders, thus are inserted in this work. The corn is first soaked, then by mechanical devices the different parts of the corn are separated. First the germ is taken out; then the bran, which is the hull of the corn, is separated from the gluten and starchy portions. The gluten and starch are then separated by a filter process. The starch, being the heavier of the two, settles to the bottom, while the gluten runs off and is taken to the feed house where it is kiln dried into gluten meal.

BUFFALO GLUTEN FEED.

Buffalo gluten feed, like gluten meal, is a by-product of corn, produced in the manufacture of starch. It differs from gluten meal in that it contains the hulls (corn bran) as well as the gluten part of the corn. Gluten and corn bran are found in gluten feed in about the following proportions: gluten 55 per cent; corn bran or hulls 45 per cent. The corn bran gives it more bulk than gluten meal, thus making it an easier product to feed. It does not contain as much protein, however, as gluten meal. For the

average farmer we would recommend the use of gluten feed in preference to gluten meal unless his other grain feed is of a bulky nature.

GERM OIL MEAL.

Germ oil meal, like both gluten meal and gluten feed, is a by-product of corn, produced in the manufacture of starch. The germs are extracted from the corn by a mechanical process after which they are taken to the feed house and dried. They are then ground into a fine meal which is cooked under high steam temperature. From this cooker the meal is placed under hydraulic pressure for the purpose of extracting the oil. With the present mechanical devices for the extraction of the oil, about ten per cent is left, which accounts for the fact that germ oil meal contains ten per cent of oil. After the cakes are taken from the press they are dried and run through a grinder, making the germ oil meal.

DRIED BLOOD.

This is a product from packing houses, prepared as follows: The blood runs from the cattle when stuck, into a receptacle from which it is promptly pumped into a cooking tank where it is cooked to a point where the water separates from the clots. It is then dropped into large press cloths and put under hydraulic pressure to press out most of the water. The residue, which is then in the form of a cake about three inches thick and containing about 50 per cent of moisture is put into a mechanical dryer, which is heated by steam radiation, from which it comes, containing about 6 per cent of moisture. It is then ready for the mill where it is ground and put into sacks ready for the market. In the preparation of blood for feeding purposes it must be handled very quickly and not allowed to decompose between the different stages of manufacture. Some samples of blood have a frightful odor, caused by decomposition in the process of manufacture.

CONDIMENTAL, OR STOCK FOODS.

In commenting on the various stock foods we insert the following extract from Bulletin 132 of the Connecticut

Experiment Station. While it does not deal with all three of the foods used in our experiment, it discusses several which were not included and furnishes much valuable data regarding the composition of stock foods in general:

“While collecting commercial feeding stuffs for analysis, there were brought by our agents samples of all the brands of Condimental and Medicinal Cattle and Poultry Foods, which were found in the state.

“They have been analyzed by the Station Staff and have also been carefully examined microscopically by Mr. Winton to identify the materials of which they are compounded.

“The results of both the chemical and microscopic analyses appear in the table in the following pages, and may be summarized as follows:

“Of the cattle feeds, three have 24 per cent and more of protein — as much as is found in the gluten feeds — four others have about the same quantity of protein as wheat bran, and one has less than corn meal of average quality.

“But one of them is a ‘concentrated feed’ in the common acceptance of that word.

“Five of the number have considerable quantities of salt, amounting in one case to more than 16 per cent, and four contain sulphur, an old-fashioned ‘spring medicine.’ The largest quantity of sulphur found was 3.90 per cent. Charcoal is an ingredient of five of the cattle feeds.

“The poultry foods are not very different from the cattle foods, either in composition or in the materials of which they are made. The table also gives in detail the materials out of which these condimental foods are prepared. The list comprises the common feeds, cotton-seed meal, linseed meal, wheat feed, corn meal and malt sprouts, and the old-time remedies: sulphur, salt, Epsom salts, charcoal, cayenne, gentian, ginger, turmeric and fenugreek, to which are added mustard hulls and cocoa shells.

“The poultry foods are made up of these same things (some of them containing considerable quantities of salt), and in addition, iron oxide, carbonate of lime (shells), and ground bone.

“In the condimental foods examined no injurious drugs have been found. They are for the most part old-time, simple remedies which most farmers buy very cheaply at the village grocery or drug store and keep in the house for use.

“There are only two things which call for further notice.

“*The Claims made for these Feeds.* The special claims made for these feeds in advertisements and on the containing packages are very numerous and are of two rather distinct kinds: First, that they are appetizers, giving an agreeable odor or taste to the feed, thus inducing stock to eat more of it, and also making them digest it better than they otherwise would. Secondly, that the foods have great medicinal value.

“The claims made under this latter head are as extravagant as those made for patent medicines sold for human use and are supported in some cases by testimonials about as valuable. For example;

Station No.	BRAND	DEALER	Price per package, cents	Approximate weight of package, pounds
	<i>Cattle Foods</i>			
3013	Baum's Stock Food. Baum's Castorine Co., Syracuse, N. Y.....	<i>Middletown</i> Meech & Stoddard....		
1912	Benjamin's Food for Horses and Cattle. Benjamin's Food Co., Danbury, Conn.	<i>Danbury</i> F. C. Benjamin & Co..	25	2
1902	International Stock Food. Int. Food Co., Minneapolis.....	<i>New London</i> A. C. Rogers.....	25	2
1905	Myer's Royal Horse and Cattle Spice. Niagara Falls, N. Y.....	<i>Norwich</i> J. P. Holloway.....	25	2
1906	Nutriotone. Thorley Food Co., Chicago	<i>Willimantic</i> A. E. Buck & Co.....	50	2
1909	Orange Electric Food. G. E. Vincent, Catskill, N. Y.....	<i>Rockville</i> Edward White.....	50	3
1901	Pratt's Animal Regulator. Philadelphia	<i>New London</i> Beebe & Bragaw	25	1½
1907	Medicated Meal. F. C. Sturtevant, Hartford, Conn.....	<i>Hartford</i> W. H. Toby	25	1½
	<i>Poultry Foods</i>			
1908	Baum's Poultry Food. Baum's Castor- ine Co., Syracuse.....	<i>Thompsonville</i> H. K. Brainard.....	25	2
1911	Benjamin's Poultry Food.....	<i>Danbury</i> F. C. Benjamin.....	25	2
1910	Dr. Hess' Poultry Panacea. Dr. Hess & Clark, Ashland, O.....	<i>South Norwalk</i> G. C. Stillson.....	25	1½
1903	International Poultry Food. Int. Food Co., Minneapolis.....	<i>Norwich</i> Norwich Grain Co. ...	25	2
1914	Myer's Royal Poultry Spice. Niagara Falls, N. Y.....	<i>East Hartford</i> W. J. Cox.....	35	2
1904	Pratt's Poultry Food. Philadelphia....	<i>Norwich</i> A. A. Beckwith.....	25	1½
1913	Triplex Poultry Food. Triplex Food Co., New Brunswick, N. J.....	<i>Waterbury</i> Spencer & Pierpont..	25	1½

(For chemical analysis see following page.)

Station No.	Water	ASH		Free sulphur	Protein	Crude fiber and charcoal	Nitrogen-free extract	Fat	PRINCIPAL INGREDIENTS
		Total ash	Common Salt						
3013	9.28	12.27*	3.59	3.90	25.84	19.37	25.19	4.15	Linseed meal, charcoal, salt, Epsom salts, sulphur.
1912	6.92	5.52	.....	.....	27.82	7.57	45.92	6.25	Linseed meal, wheat feed, fenugreek.
1902	6.13	12.50	8.38	.....	14.31	14.51	47.88	4.67	Wheat feed, cayenne, a bitter drug, ¶ salt, charcoal.
1905	6.10	20.34	16.52	.....	17.81	5.84	47.86	2.05	Linseed meal, corn meal, wheat feed, mustard hulls, cocoa shells, malt sprouts, fenugreek, turmeric, salt.
1906	5.94	21.49	13.10	.83	18.97	5.10	42.23	5.44	Linseed meal, corn meal, wheat feed, cotton seed meal, fenugreek, salt, charcoal, sulphur.
1909	6.80	4.00	.....	.40	15.03	7.81	58.92	7.04	Corn meal, linseed meal, charcoal, sulphur.
1901	6.67	12.40	10.11	.....	9.69	3.12	63.75	4.37	Corn meal, fenugreek, a bitter drug, ¶ salt, charcoal.
1907	6.34	8.94	.....	2.93	24.10	10.98	39.08	7.63	Linseed meal, corn meal, ginger, fenugreek, a bitter drug, sulphur.
1908	6.95	16.68†	4.88	6.73	19.53	15.40	32.62	2.09	Linseed meal, wheat feed, cayenne, charcoal, salt, Epsom salts, iron oxide, sulphur.
1911	7.05	5.42	.....	.....	29.19	8.44	42.92	6.98	Linseed meal, wheat feed, corn meal, cotton seed meal, mustard hulls.
1910	6.98	35.67‡	11.65	.....	11.94	5.17	37.80	2.44	Wheat feed, charcoal, salt, lime carbonate, iron oxide.
1903	6.79	7.87	2.26	.....	14.88	13.97	49.69	6.80	Wheat feed, cayenne, a bitter drug, charcoal, salt.
1914	6.17	17.00	12.88	.....	18.19	7.93	45.42	5.29	Linseed meal, corn meal, wheat feed, mustard hulls, cocoa shells, fenugreek, turmeric, cayenne, salt.
1904	7.01	6.28§	.....	.81	14.87	6.04	56.94	8.05	Corn meal, wheat feed, a bitter drug, iron oxide, sulphur.
1913	5.76	40.87¶	.....	.93	18.03	4.57	25.38	4.46	Linseed meal, wheat feed, charcoal, ground bone, lime carbonate, iron oxide, sulphur.

*Of which, magnesia 1.57, sulphuric acid 2.03, lime 0.80, carbonic acid 0.85 per cent.

†Of which, magnesia 0.66, sulphuric acid 1.82, lime 0.63, carbonic acid 1.62, phosphoric acid 1.22, oxide of iron 1.89, sand 1.50 per cent.

‡Of which, lime 6.00, carbonic acid 5.98, phosphoric acid 1.09, oxide of iron 2.97, sand 0.88 per cent.

§Of which, oxide of iron 1.12 per cent.

¶Of which, lime 19.29, magnesia 0.54, phosphoric acid 11.67, carbonic acid 5.33 per cent.

¶¶ Corresponds with gentian in microscopic structure.

(For name of food see preceding page.)

“One ‘cures hog cholera, makes pigs grow quickly, dairy cows produce more butter and milk, stops slinking of calves . . . and regulates horses.’

“This takes the place of another article made by the same firm and is ‘much more highly concentrated.’ This highly concentrated feed, which cures hog cholera, contains less protein than any other of the condimental foods, and consists of corn meal, salt, charcoal, fenugreek and a bitter drug, probably gentian.

“Another, which ‘is the most effectual and economical remedy known for diseases of cattle,’ guaranteed to cure ‘scours’ in calves, consists of corn meal, linseed meal, charcoal and sulphur.

“Still another ‘is composed of laxatives, and tonics in abundance, aromatics in just proportion, diuretics, expectorants and alteratives.’

“This beneficial mixture is made of linseed meal’ corn meal, ginger, fenugreek, a bitter drug and sulphur.

“Other brands of condimental food with less remarkable claims for medicinal value are advertised as food ‘auxiliaries,’ ‘appetizers’ and flesh and milk producers.

“It is interesting to note that the Poultry Feeds are very like the Cattle Feeds, both in chemical composition and in materials used, so that were the claims of the manufacturer all valid, a condimental feed which would cure gapes in chickens might be expected to increase the flow of milk of cows and also to cure hog cholera.

“The mildly curative properties of the various drugs used in these feeds are well understood by most dairy farmers, as well as their limitations.

“The claims that by the use of condiments and spices the digestibility of food can be increased and in this way a saving of feed can be effected, have no basis in fact. No experiments have demonstrated or made even probable such an effect. Stock feeders will be very slow to believe that cotton-seed meal, linseed meal, wheat feeds or corn products can be made more easily digestible or even more acceptable to healthy cattle by mixing with them Epsom salts, charcoal, ginger or fenugreek.”

As previously stated, eleven lots of cattle were fed. The following rations were used:

Lot No. 1. Corn and wheat straw; at the beginning fifteen pounds of snapped corn per head was the daily allowance; when on full feed they consumed as high as twenty-seven pounds of corn meal per head per day.

Lot No. 2. Corn, old process oil meal and wheat straw; at the beginning fifteen pounds of snapped corn and one-eighth of a pound of oil meal per head was the daily allowance; when on full feed they consumed twenty-five pounds of corn meal and four pounds of oil meal per steer per day.

Lot No. 3. Corn, cottonseed meal and wheat straw.

At the beginning they were fed fifteen pounds of snapped corn and one-eighth of a pound of cottonseed meal. After forty-two days feeding, when the cattle were eating twenty-five pounds of corn and cob meal and two and one-half pounds of cottonseed meal per head per day, they were very suddenly affected, three of the animals dying and the rest going blind and refusing to eat, so that they had to be marketed. A post-mortem examination revealed the fact that the stomachs of the animals were very much inflamed, being red and blue in color.

Lot No. 5. Corn, Buffalo gluten feed and wheat straw. the beginning they were fed fifteen pounds of snapped corn and one-eighth of a pound Buffalo gluten feed per per day. When on full feed, they were consuming twenty-four pounds of corn meal and four pounds of gluten meal per steer per day.

Lot No. 5. Corn, Buffalo gluten and wheat straw. At the beginning they were fed fifteen pounds snapped corn and one-eighth of a pound Buffalo gluten feed per steer per day. When on full feed they were consuming twenty-four and one-half pounds corn meal and four and one-half pounds Buffalo gluten feed per head per day.

Lot No. 6. Corn, germ oil meal and wheat straw. At the beginning they were fed fifteen pounds of snapped corn and one-eighth of a pound of germ oil meal per head per day. When on full feed they were consuming twenty-four pounds corn meal and four pounds germ oil meal per head per day.

Lot No. 7. Corn, dried blood and wheat straw. At the beginning they were fed fifteen pounds of snapped corn and one-tenth of a pound of dried blood per head per day. When on full feed they were consuming twenty-five pounds of corn meal and one pound of dried blood per head per day.

Lot No. 8. Corn, Iowa Stock Food and wheat straw. At the beginning they were fed fifteen pounds of snapped corn and one-fortieth of a pound of Iowa Stock Food per head per day. When on full feed they were consuming twenty-four pounds of corn meal and one-tenth of a pound of Iowa Stock Food per head per day.

Lot No. 9. Corn, International Stock Food and wheat straw. At the beginning they were fed fifteen pounds of snapped corn and one-fortieth of a pound of

ERRATA

Paragraphs numbers 2 and 3 on page 234 should read as follows:

Lot No. 4. Corn, gluten meal and wheat straw. At the beginning they were fed fifteen pounds of snapped corn and one-eighth of a pound gluten meal per day. When on full feed, they were consuming twenty-four and one-half pounds of corn meal and four pounds of gluten meal per steer per day.

Lot No. 5. Corn, Buffalo gluten feed and wheat straw. At the beginning they were fed fifteen pounds snapped corn and one eighth of a pound Buffalo gluten feed per steer per day. When on full feed, they were consuming twenty-four and one-half pounds corn meal and four pounds Buffalo gluten feed per head per day.

International Stock Food per steer per day. When on full feed they were eating twenty-six pounds of corn meal and one-seventh of a pound of International Stock Food per steer daily.

Lot No. 10. Corn, Standard Stock Food and wheat straw. At the the beginning they were fed fifteen pounds of snapped corn and one-fortieth of a pound of Standard Stock Food per steer per day. When on full feed they were eating twenty-five pounds of corn meal and one-seventh of a pound of Standard Stock Food per steer daily.

Lot No. 11. Corn and wheat straw for six weeks, after which time they were fed corn and allowed the run of a twenty-one acre field of timothy pasture of two years' standing. At the beginning they were fed fifteen pounds of snapped corn per head per day. When on full feed on pasture they consumed twenty-four pounds of corn meal per head per day.

On April 15th a crippled steer in Lot No. 5 was taken out. The feed he ate up to that date is charged to his lot and the gains made by him are likewise credited to his lot. He was as good as the average of the lot before the accident. On May 6th a steer was taken out of each of lots Nos. 1 and 4. These steers, like the one taken out of Lot No. 5, received injuries in the feed yards which were in no way caused by the feed fed, thus had to be removed. The feed consumed by them was charged against their lots and the gains made were likewise credited to them. The steer taken out of Lot No. 1 was hardly up to the average of his bunch, while the steer taken out of Lot No. 4 was much better than the average of his lot.

The cottonseed meal lot is credited with the gains made up to the time they were affected. They are charged with the food consumed up to that date. No fair comparison can be made of their selling price as they were marketed on a dull market and much sooner than they should have been. Just why the cattle fed on cottonseed meal should have been so affected, we are unable to answer. They were only getting two and one-half pounds of cottonseed meal per head per day. In other experiments at this station as high as five pounds per head daily have been fed and there are many feeders who have fed as much as six and eight pounds of cottonseed meal per head per day

without any ill results. It is a well known fact that cottonseed meal when fed directly to hogs has proved fatal. In this instance the hogs which followed the steers were not affected at all. It is just possible that the trouble was due to the fact that we were feeding it in conjunction with corn and cob meal, which contained a large percentage of cob, and wheat straw as a roughage. It is our intention to do more work with cottonseed meal along this line. We can say without any hesitation that cottonseed meal can be fed with safety to fattening cattle when clover hay and shelled corn are used in conjunction with it. It has also been fed with excellent results in conjunction with other grain rations and various kinds of fodder for roughage. In this instance, however, we experienced the difficulty as cited above.

At the beginning of the experiment, twenty good barrow pigs, averaging 14½ pounds each, were placed in each feed lot to utilize the undigested corn which passed through the cattle. They received no feed except what they got out of the droppings of the steers. The hogs did not make very good gains. In fact, the gains were so small that we were obliged to take out one-half of them (ten) at the end of eight weeks. The hogs were not in fit condition for market at the conclusion of the experiment, thus were held over to be marketed later. The gains made by each lot of hogs is credited to their respective lots of cattle at a valuation of seven cents per pound.

The results of this work clearly indicate that where care and good judgment are used in the preparation of feed and the feeding of the same to cattle, that there is not much wasted. Even in the beginning of the experiment when the cattle were fed on snapped corn the hogs apparently did not find much nutriment in the droppings, as they made very light gains. The hogs which followed the grass fed cattle made the heaviest gains. This might be accounted for in two ways. First, the grass furnished them considerable food, and secondly, according to the theories advanced by some experimenters, more corn passed through grass fed cattle than through those on dry feed, due to the looseness of the bowels of those on grass. Be that as it may, the hogs following the grass fed cattle made much the best gains in this instance.

In computing the cost of gains in the various lots the

following valuations were placed on the various feed stuffs used. These were the actual market prices of the same, as quoted by the various companies. For the various stock foods we quote prices on half-ton lots, which show them up in a more favorable light than they would appear were we to use the higher rates on 100 pound lots.

Snapped Corn.....	\$ 16.00 per ton
Shelled Corn.....	20.00 per ton
Corn and Cob Meal.....	18.00 per ton
Corn Meal.....	22.00 per ton
Oil Meal (old process).....	25.00 per ton
Gluten Meal.....	26.00 per ton
Buffalo Gluten Feed.....	22.50 per ton
Germ Oil Meal.....	23.00 per ton
Dried Blood.....	45.00 per ton
Iowa Stock Food.....	75.00 per half ton
International Stock Food.....	100.00 per half ton
Standard Stock Food.....	80.00 per half ton
Cotton-seed Meal.....	28.00 per ton
Wheat Straw.....	3.00 per ton

The following tables give the value of feed consumed, total gains, average gain per steer, average daily gain per steer, and cost of producing one hundred pounds of gain in each of the various lots of cattle:



LOT I.

CORN AND WHEAT STRAW.

Kinds of Feed	Value of Feed Consumed		
	No. of Pounds	Value per Ton	Value
Snapped Corn	4970	\$16.00	\$ 39.75
Shelled Corn	2310	20.00	23.10
Corn and Cob Meal	11530	18.00	103.77
Corn Meal	24110	22.00	265.21
*Wheat Straw	25377	3.00	38.00
			\$469.84

Value of feed consumed in 94 days. \$469.84.

Total gain on entire lot, 4387½ pounds.

Average gain per steer, 225½ pounds.

Average daily gain per steer, 2.39 pounds.

Cost of producing 100 pounds of gain, \$10.71.

*Estimated.



LOT II.
CORN, OIL MEAL AND WHEAT STRAW.

Kinds of Feed	Value of Feed Consumed		
	No. of Pounds	Value per Ton	Value
Snapped Corn	4970	\$16.00	\$ 39.76
Shelled Corn	2310	20.00	23.10
Corn and Cob Meal.....	11660	18.00	104.94
Corn Meal	23370	22.00	257.07
Oil Meal	4312½	25.00	53.91
*Wheat Straw	26666	3.00	40.00
			\$518.78

Value of feed consumed in 94 days, \$518.78.
 Total gain on entire lot, 4710 pounds.
 Average gain per steer, 235½ pounds.
 Average daily gain per steer, 2.51 pounds.
 Cost of producing 100 pounds of gain, \$11.02.

*Estimated.



LOT IV.
CORN, GLUTEN MEAL AND WHEAT STRAW.

Kind of Feed.	Value of Feed Consumed		
	No. of Pounds	Value per Ton	Value
Snapped Corn.....	4970	\$16.00	\$ 39 76
Shelled Corn.....	2310	20.00	23.10
Corn and Cob Meal.....	11590	18.02	104.31
Corn Meal.....	21900	20.00	240.90
Gluten Meal.....	4312½	26.00	56.06
*Wheat Straw.....	25331	3.00	38.00
			\$502.13

Value of feed consumed in 94 days, \$502.13.
 Total gain on entire lot, 5376½ pounds.
 Average gain per steer, 275½ pounds.
 Average daily gain per steer, 2 92 pounds.
 Cost of producing 100 pounds of gain, \$9.34.

*Estimated.



LOT V.
CORN, BUFFALO GLUTEN FEED AND WHEAT STRAW.

Kinds of Feed	Value of Feed Consumed		
	No. of Pounds	Value per Ton	Value
Snapped Corn.....	4970	\$16.00	\$ 39.76
Shelled Corn.....	2310	20.00	23.10
Corn and Cob Meal.....	11070	18.00	99.63
Corn Meal.....	22270	22.00	244.97
Gluten Feed.....	5261½	22.50	59.19
*Wheat Straw.....	25337	3.00	38.00
			\$504.65

Value of feed consumed in 94 days, \$504.65.
 Total gain on entire lot, 5229½ pounds.
 Average gain per steer, 270 pounds.
 Average daily gain per steer, 2.88 pounds.
 Cost of producing 100 pounds gain, \$9.65.

*Estimated.



LOT VI.
CORN, GERM OIL MEAL AND WHEAT STRAW.

Kinds of Feed	Value of Feed Consumed		
	No. of Pounds	Value per Ton	Value
Snapped Corn.....	4970	\$16.00	\$ 39.76
Shelled Corn.....	2310	20.00	23.10
Corn and Cob Meal.....	11470	18.00	103.23
Corn Meal.....	22940	22.00	252.34
Germ Oil Meal.....	4264½	23.00	49.04
*Wheat Straw.....	26666	3.00	40.00
			\$507.47

Value of feed consumed in 94 days, 507.47.
 Total gain on entire lot, 4360 pounds.
 Average gain per steer, 218 pounds.
 Average daily gain per steer, 2.32 pounds.
 Cost of producing 100 pounds gain, \$11.64.

*Estimated.



LOT VII.
CORN, DRIED BLOOD AND WHEAT STRAW.

Kinds of Feed	Value of Feed Consumed		
	No. of Pounds	Value Per Ton	Value
Snapped Corn	4970	\$16.00	\$ 39.76
Shelled Corn	2310	20.00	23.10
Corn and Cob Meal.....	11680	18.00	105.12
Corn Meal.....	23490	22.00	258.39
Dried Blood.....	1662½	45.00	37.41
*Wheat Straw.....	26666	3.00	40.00
			\$503.78

Value of feed consumed in 94 days, \$503.78.

Total gain on entire lot, 4360 pounds.

Average gain per steer, 227¼ pounds.

Average daily gain per steer, 2.42 pounds.

Cost of producing 100 pounds of gain \$11.08.

*Estimated.



LOT VIII.
CORN, IOWA STOCK FOOD AND WHEAT STRAW.

Kinds of Feed	Value of Feed Consumed		
	No. of Pounds	Value Per Ton	Value
Snapped Corn.....	4970	\$16.00	\$ 39.76
Shelled Corn	2310	20.00	23.10
Corn and Cob Meal	11240	18.00	101.16
Corn Meal.....	21365	22.00	235.02
Iowa Stock Food	200 $\frac{3}{4}$	75.00 per Half Ton	15.06
*Wheat Straw.....	26666	3.00	40.00
			\$454.16

Value of feed consumed in 94 days, \$454.10.
 Total gain on entire lot 4320 pounds.
 Average gain per steer. 216 pounds.
 Average daily gain per steer 2.30 pounds.
 Cost of producing 100 pounds of gain, \$10.51.

*Estimated.



LOT IX.
CORN, INTERNATIONAL STOCK FOOD AND WHEAT STRAW.

Kinds of Feed	Value of Feed Consumed		
	No. of Pounds	Value per Ton	Value
Snapped Corn.....	4970	\$16.00 *	\$ 39.76
Shelled Corn	2310	20.00	23.10
Corn and Cob Meal	11560	18.00	104.04
Corn Meal.....	24550	22.00	270.05
International Stock Food.....	204 $\frac{1}{4}$	200.00	20.43
*Wheat Straw.....	26666	3.00	40.00
			\$497.38

Value of food consumed in 94 days, \$497.38.
 Total gain on entire lot 3710 pounds.
 Average gain per steer, 185 $\frac{1}{2}$ pounds.
 Average daily gain per steer, 1.97 pounds.
 Cost of producing 100 pounds of gain, \$3.41.

*Estimated.



LOT X.
CORN, STANDARD STOCK FOOD AND WHEAT STRAW.

Kinds of Feed	Value of Feed Consumed		
	No. of Pounds	Value Per Ton	Value
Snapped Corn.....	4970	\$16.00	\$ 39.76
Shelled Corn.....	2310	20.00	23.10
Corn and Cob Meal.....	11710	18.00	105.39
Corn Meal.....	23570	22.00	259.27
Standard Stock Food.....	250½	160.00	20.04
*Wheat Straw.....	26666	3.00	20.00
			\$487.56

Value of feed consumed in 94 days, \$487.56.
 Total gain on entire lot, 4080 pounds.
 Average gain per steer, 204 pounds.
 Average daily gain per steer, 2.17 pounds.
 Cost of producing 100 pounds of gain, \$11.95.

*Estimated.



LOT XI.
CORN AND GRASS.

Kinds of Feed	Value of Feed Consumed		
	No. of Pounds	Value Per Ton	Value
Snapped Corn.....	4970	\$16.00	\$ 39.76
Shelled Corn	2310	20.00	23.10
Corn and Cob Meal	11693	18.00	105.21
Corn Meal.....	23040	22.00	253.44
*Wheat Straw.....	10666	3.00	16.00
Pasture two months.....	20 head Steers at \$1.00 per month		40.00
			\$477.51

Value of feed consumed in 94 days, \$477.51.
 Total gain on entire lot, 4680 pounds.
 Average gain per steer, 224 pounds.
 Average daily gain per steer, 2.49.
 Cost of producing 100 pounds of gain, \$10.20.

*Estimated.

LOT III.

*CORN, COTTONSEED MEAL AND WHEAT STRAW.

Kind of Feed	Value of Feed Consumed		
	No. of Pounds	Value per Tn	Value
Snapped Corn.....	4970	\$16.00	\$ 39.76
Shelled Corn	2310	20.00	23.10
Oorn and Cob Meal.....	10040	18.00	90.36
Corn Meal.....	2070	22.00	22.77
Cotton Seed Meal.....	1495½	28.00	14.69
*Wheat Straw.....	13333	3.00	20.00
			\$210.68

Value of feed consumed in 45 days, \$210.68.
 Total gain on entire lot, 3140 pounds,
 Average gain per steer, 107 pounds.
 Average daily gain per steer, 2.38 pounds.
 Cost of producing 100 pounds of gain, \$9.84.

In computing the above tables, the beginning and final weights at Odebolt were used. The cattle were weighed out of the feed lots under uniform conditions in both instances without any allowance being made for shrinkage. This seems to us to be the only fair basis on which to summarize our total gains and average daily gains per head. Exact account was kept of all the grain feed consumed. In the case of the roughage, which was wheat straw, we had to estimate the amount consumed by each lot though the figures are approximately correct. The straw was placed in the feed racks once a week and was kept before the cattle at all times.

In the case of Lot XI a few words of explanation should be given. This lot was fed exactly the same as Lot I until the grass season arrived, when they were allowed the run of a twenty-one acre field of timothy pasture of two years' standing. The pasture was only fair—not nearly enough grass for good returns. The returns made by this lot, while good, are not nearly up to what

*Marketed at end of forty-two days on account of trouble previously mentioned.

†Estimated.

we would expect had we had a forty-acre field of good blue grass pasture, in which instance we would not have fed over one-half the amount of grain which we fed to these cattle.

The remainder of the above tables explain themselves and need no further comment in this connection.

The following table gives the total amount and value of the pork produced by the hogs following each of the various lots of cattle. As previously stated, the hogs received no other feed than that which passed through the steers in the droppings. The value of the pork produced is estimated on a \$7.00 per hundred basis, which is 55 cents per hundred below the top of the market when the experiment closed.

AMOUNT AND VALUE OF PORK PRODUCED BY HOGS FOLLOWING
EACH OF THE VARIOUS LOTS OF CATTLE

	Pounds of Pork	Price per 100 lbs.	Value
Lot I. Corn alone.....	506	\$7.00	\$35.43
Lot II. Corn and Oil Meal.....	465	7.00	32.55
Lot III. Corn and Gluten Meal.....	362	7.00	25.34
Lot IV. Corn and Gluten Feed.....	427	7.00	29.89
Lot V. Corn and Germ Oil Meal.....	435	7.00	30.45
Lot VI. Corn and Dried Blood.....	540	7.00	37.80
Lot VII. Corn and Iowa Stock Food.....	435	7.00	30.45
Lot VIII. Corn and International Food...	525	7.00	36.75
Lot X. Corn and Standard Stock Food.	397	7.00	27.79
Lot XI. Corn and Grass.....	707	7.00	49.49

It will be seen by studying the above table that the hogs following Lot XI, which was fed on corn and grass, made much the best gains, while those following Lot IV, which was fed on corn, gluten meal and wheat straw, made the lightest gains, while the steers in this lot made the heaviest gains.

The following table gives the average net profit per steer in each of the various lots fed, and furnishes much

data from which the cattle feeder can arrive at conclusions regarding the relative value of the various feeds used. As previously stated, the cattle at the beginning of the experiment were weighed for three consecutive days and the average of the three days' weights was used as the starting weight. No allowance was made for shrinkage, as in the previous tables the final weights were taken on the same basis. For this table, however, we deducted a three per cent shrinkage (the usual shrinkage required by local dealers) from the original beginning weight, in order that we might arrive at a fair basis for determining the beginning weight, as our final weight in this case was the selling weight of the cattle at the Union Stock Yards, Chicago. A valuation of five cents per pound was placed on the cattle at the commencement of the feeding. The valuation might have been considered by some to have been rather high. In arriving at the cost of the feed each lot was charged market prices for all of the feed consumed.

At the conclusion of the experiment the cattle were consigned to Clay, Robinson & Company, who sold them on their merits to Nelson Morris & Company. Each lot was valued separately and was considered to be worth the price credited to it, as indicated in the following table. The various lots were carried through a slaughter test, the results of which are reported later on in this bulletin. It will be seen that the prices ranged from \$7.00 to \$7.65 per cwt. The total proceeds per steer includes his selling price on the Chicago market plus the average value of pork produced per steer for each of the respective lots. The net profit per steer was arrived at by deducting the value of the steer at the beginning at five cents per pound; the value of the feed consumed, the expense connected with the marketing, such as freight, commission, yardage, feed, etc., from the total proceeds obtained for each steer. No allowance has been made for the labor involved in the feeding of the cattle or for the interest on the investment, two factors which must be considered. On the other hand, no allowance has been made for the manure made by the cattle, a most valuable source of income to the farmer who feeds stock.

	NUMBER OF LOT	Average Weight of Steers at beginning	Average Value of Steers at 5c per lb.	Average Cost of Feed per Steer	Average Weight of Steers at Chicago	Average Selling Price per Cwt.	Average Value of Steers at Chicago	Average Value of Pork per Steer	Average Expense per Steer in Connection with Marketing	Average Total Proceeds per Steer	Average Net Profit per Steer
I.	Corn	1042 lbs.	\$52.10	\$24.10	1244 lbs	\$7.45	\$ 92.68	\$1.86	\$3.85	\$94.54	\$14.49
II.	Corn and Oil Meal.	1082 lbs.	54.10	25.94	1295 lbs	7.50	97.12	1.62	3.85	98.74	14.85
IV.	Corn and Gluten Meal.	1075 lbs.	53.75	25.80	1321 lbs.	7.65	100.06	1.33	3.85	101.39	17.99
V.	Corn and Gluten Feed	1025 lbs	51.25	25.92	1277 lbs.	7.60	97.05	1.57	3.85	98.62	17.60
VI.	Corn and Germ Oil Meal	1075 lbs.	53.75	25.37	1265 lbs.	7.40	93.61	1.52	3.85	95.13	12.16
VII.	Corn and Dried Blood.	1062 lbs.	53.10	25.19	1258 lbs.	7.60	95.61	1.89	3.85	97.50	15.36
VIII.	Corn and Iowa Food.	1015 lbs.	50.75	22.70	1201 lbs.	7.40	88.87	1.52	3.85	90.39	13.09
IX.	Corn and International Food.	1016 lbs.	50.80	24.87	1167 lbs.	7.20	84.02	1.83	3.85	85.85	6.33
X.	Corn and Standard Food.	1030 lbs	51.50	24.38	1198 lbs.	7.00	83.86	1.39	3.85	85.25	5.52
XI.	Corn and Grass	1053 lbs.	52.65	25.07	1246 lbs.	7.55	94.07	2.47	3.85	96.54	14.97

In the above table the column on the extreme right giving the average net profit per steer, shows quite a wide variation. It will be seen that in this test a ration of gluten meal, corn and wheat straw returned a net profit of \$3.50 per steer more than a ration of corn and wheat straw. A ration of Buffalo gluten feed, corn and wheat straw returned a net profit of \$3.11 per steer more than a ration of corn and wheat straw. A ration of dried blood, corn and wheat straw returned a net profit of 97 cents per steer more than a ration of corn and wheat straw. A ration of corn and grass returned a net profit of 48 cents per steer more than a ration of corn and wheat straw. A ration of old process oil meal, corn and wheat straw returned a net profit of 36 cents more per steer than a ration of corn and wheat straw. A ration of Iowa Stock Food, corn and wheat straw returned a net profit of \$1.40 per steer less than a ration of corn and wheat straw. A ration of germ oil meal, corn and wheat straw returned a net profit of \$2.33 per steer less than a ration of corn and wheat straw. A ration of International Stock Food, corn and wheat straw returned a net profit of \$8.16 per steer less than a ration of corn and wheat straw. A ration of Standard Stock Food, corn and wheat straw returned a net profit of \$8.92 per steer less than a ration of corn and wheat straw. Corn alone in this experiment showed up remarkably well, especially so when we bear in mind that it was fed in conjunction with wheat straw as a roughage.

The following table shows the price per bushel obtained for the corn consumed by each of the various lots of cattle. This was estimated by crediting all of the profits realized to the corn fed. The other feeds were all secured for the prices quoted in the feed valuation column, thus the net loss or gain should be credited to the corn fed.

**PRICE PER BUSHEL RETURNED BY EACH OF THE VARIOUS
LOTS OF CATTLE FOR THE CORN CONSUMED**

Lot I.	Corn alone	returned \$.93 per bushel
Lot II.	Corn and Oil Meal	“ .95 per bushel
Lot IV.	Corn and Gluten Meal	“ 1.04 per bushel
Lot V.	Corn and Gluten Feed	“ 1.03 per bushel
Lot VI.	Corn and Germ Oil Meal	“ .88½ per bushel
Lot VII.	Corn and Dried Blood	“ .96 per bushel
Lot VIII.	Corn and Iowa Stock Food	“ .92½ per bushel
Lot IX.	Corn and International Stock Food . . . . .	.72 per bushel
Lot X.	Corn and Standard Stock Food . . . . .	.70½ per bushel
Lot XI.	Corn and Grass . . . . .	.97 per bushel

It will be noticed by the above table that all the lots paid much higher prices for corn than could have been received for the same at any of the markets during the feeding period. Where corn alone was fed, 93 cents per bushel was realized. When gluten meal was added to the corn ration \$1.04 per bushel was realized, an increase of eleven cents per bushel, while the addition of International and Standard Stock Foods to the corn rations reduced the price of corn per bushel 21 and 22½ cents each, respectively, below that received where corn alone was fed. These figures show a wide variation in the prices paid per bushel, the most extreme case being the instance of the gluten meal and corn, where \$1.04 per bushel was paid, and the case of Standard Stock Food and corn, where but 70.5 cents per bushel was paid, a difference of 33.5 cents. A farmer will haul corn ten miles out of his way for three cents more per bushel. What would he do for 33.5 cents per bushel?

The following table gives the results of the slaughter test as conducted by Nelson Morris & Company, who purchased the cattle. On account of the short time which the cattle were on feed and the age of the animals, no marked differences in the carcasses could be expected. The table gives the percentage of shrinkage in shipping, the percentage of dressed weight, the percentage of shrinkage in cooling the carcasses, the percentage of loose fat and the average weight of the hides of each of the various lots. The grass lot quite naturally suffered the heaviest shrink in shipping. The carcasses were inspected by an expert in the employ of the company, who pronounced them all to be of good quality and color. Lot 4, which had been fed on gluten meal, was pronounced to be decidedly the best. Aside from this there did not seem to be any perceptible difference in carcasses of the different lots.

REPORT OF SLAUGHTER TEST CONDUCTED BY NELSON MORRIS & CO., PACKERS,
UNION STOCK YARDS, CHICAGO, ILLINOIS

Number of Lot and Ration Fed	Average home weight	Average Chicago weight	Average shrinkage in shipping per steer	Average per cent dressed weight	Average per cent shrinkage in cooling carcasses	Average per cent loose fat	Average weight of hides
1. Corn	1299	1244	55	58.8	2.1	4.8	77.1
2. Corn and Oil Meal.....	1349	1295	54	60.6	1.8	6.1	76.2
4. Corn and Gluten Meal.....	1383	1321	62	59.6	1.4	5.2	81.7
5. Corn and Buffalo Gluten Feed... ..	1327	1277	51	60.6	1.9	5.8	79.
6. Corn and Germ Oil Feed.....	1336	1265	65	60.3	1.9	5.4	75.1
7. Corn and Dried Blood.....	1321	1258	63	59.5	1.9	6.1	77.1
8. Corn and Iowa Stock Food.....	1261	1201	60	59.6	1.8	5.6	74.9
9. Corn and International Stock Food....	1239	1167	71	59.6	1.9	5.8	73.5
10. Corn and Standard Stock Food.....	1266	1198	68	58.7	1.9	5.	74.7
11. Corn and Grass.....	1330	1246	90	59.3	1.9	6.1	78.1

Remarks: "All test lots of cattle were good in quality and color of carcass. Lot No. 4 was better in quality than any of the other lots. Aside from Lot No. 4 no perceptible difference could be noted in any of the lots."

The following table gives the analysis of the various feeds used as reported by Dr J. B. Weems, Station Chemist :

	Water	Protein	Ash	Crude Fibre	Nitrogen Free Extract	Fat, Ether Extract
Corn Meal.....	11.4	10.9	2.2	3.7	67.	4.8
Corn and Cob Meal.....	7.3	10.	2.	8.5	68.6	3.6
Linseed Meal.....	10.2	30.2	5.2	16.2	35.2	9.
Cotton Seed Meal.....	9.	41.3	7.4	7.8	18.9	15.6
Gluten Meal.....	6.8	37.2	1.6	2.8	49.5	2.1
Gluten Feed.....	7.4	20.8	2.1	8	59.1	2.6
Germ Oil Meal.....	9.2	23.9	3.3	10.7	44.6	8.3
Dried Blood.....	7.9	70.6	3.2	1.2	16.6	.5
Iowa Stock Food.....	8.5	26.2	18.5	11.	27.7	8.1
International Stock Food.....	10.6	16.	18.5	14.7	41.9	4.3
Standard Stock Food.....	9.9	28.	18.	8.6	26.5	9.

These analyses all through indicate a composition a little lower in each of the nutrients than represented by the respective companies, with the single exception of cottonseed meal, the fat content of which was considerably higher than claimed.

The data presented in this bulletin is given as the result of one test, not as representing the exact comparative value of the various feeds used. Future experiments may modify the results to a considerable extent. As we expect to repeat this work in the near future, no deductions will be drawn in this bulletin.

