

GRADUATING THESIS.

THE VALUE OF COTTON SEED MEAL  
AS A STOCK FOOD.

by

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### THE VALUE OF COTTON SEED MEAL AS A STOCK FOOD.

The three most important principles which must be supplied in stock feed are protein, carbohydrates and fat. In most feeds fed today the two latter principles can be very easily supplied in feeds such as corn, which is the most universal feed used today, but this feed is very poor in protein which is a very important part of a ration and which costs the most. But the part of the feed which must be supplied to a feeding ration if a balanced ration is to be fed. The balanced ration not only causes the animal to make better gains when in the feed lot but also keeps them in better health and they are more resistant to disease.

The problem then that confronts the stockmen is, How can protein be added to the feed with a minimum cost. Linseed Meal, bran, and dried blood contain a large percent of this substance, but on account of the great demands for these substances, the price has risen so high that the average stockmen cannot afford to feed them. So some other source must be resorted to, and here is where cotton seed meal comes in to help out the stockmen.

This meal is made every year in large quantities at the southern oil mills and can be bought at a moderate price, about \$25 per ton.

No other food contains as much digestible protein pound for pound as does cotton seed meal. So if cotton seed meal does cost as much as oil meal or some of the other protein feeds it will pay to buy the cotton seed meal as we get much more protein than we would in the same weight of oil meal.

Recent experiments have been conducted in feeding this concentrated feed to various domestic animals. The results of some of

~~the~~ the most recent work along this line will be given in the following lines. Also some of the most recent conclusions reached in regard to the value of Cotton seed meal as a stock food.

#### Dairy Cows.

As Cotton seed meal is very rich in protein it will be an excellent supplementary food for dairy cattle if it can be fed without any serious effects. Some dairymen however have undue prejudices against it as a food for dairy cattle, but recent experiments along this line show that if fed judiciously, no more valuable concentrate can be had, and it has positively no injurious effects on the productive powers of dairy cows when rationally utilized, while it has a decidedly stimulating effect on the yield of milk and butter fat.

In 1904 the Virginia Station conducted an experiment with cotton seed meal as a food for dairy cows and obtained very favorable results.

The ration fed was cotton seed meal, corn and cob meal silage and hay in such quantities as to produce a nutritive ratio of 1 : 5, a very good ration for a dairy cow.

Data was taken during the experiment and a comparison between cotton seed meal and gluten meal was made after the experiment had been running for several weeks.

In this case the cost of the two feeds was practically the same, with a slight difference in favor of the cotton seed meal. In this case the cotton seed meal fed was of a very poor quality. Thus had the meal been of a good quality the results would have been more in favor with the cotton seed meal than with the gluten meal fed.

Numerous experiments have been conducted along this same line

in the past few years and most of them have come to the same conclusion, that cotton seed meal is an excellent food for dairy cows when fed in an intelligent manner.

Some instances have been noted where the cotton seed meal gave an undesirable odor and taste to the butter, but in these cases nearly one half of the ration consisted of cotton seed meal which is more than can be fed profitably, as a rule. When one fifth of the grain ration was cotton seed meal no bad effects were noticed and only good results were obtained.

As the other protein foods are very high in price the use of cotton seed meal will mean much more profit to the dairymen than the use of these higher priced foods. And it will be only a few years until this feed will be fed more universally to dairy cows than it is at the present time and greater will be the profits of the dairymen.

#### Cotton Seed Meal for Fattening Cattle.

The practice of fattening cattle exclusively on cotton seed meal has been a common one for about twenty three years in the south, and it is gradually growing in favor until today several hundred thousand cattle are fattened on cotton seed meal alone as a grain ration. This alone would seem to be enough evidence to prove that cotton seed meal can be fed profitably to fattening cattle. But some cattle feeders have tried feeding this feed and have given it up as an unprofitable food to give to fattening cattle but this failure was from some outside influence and not from the influence of the meal itself.

In the corn belt this may be fed with excellent results as it is a feed rich in protein and when mixed and fed with corn, which contains considerable more starch than protein, it makes an excellent

feed for fattening cattle.

The amount of cotton seed meal which a feeder is to feed his cattle and reap the largest profit depends upon several conditions. If some legume roughness, as alfalfa or clover hay, is provided for his cattle, corn may be fed alone without any protein grain ration additional, provided the corn is not too high in price, and get excellent results. Still in this case experience has proven that a grain ration consisting of 25 % cotton seed meal, and 75% corn is more satisfactory for the last thirty days of the feeding period,, as cotton seed meal gives a bloom to the cattle which no other feed can do. It gives them a smoother finish and a finished appearance and they will bring a higher price on the market than they would have otherwise done.

It is very seldom however that these legume hays can be fed at all times to fattening steers, and then is the time when some other food rich inprotein must be fed in order to get the best results from the feed consumed. And as stated before here is where cotton seed meal can be used to produce the all important factor. And it can be supplied by this by-product cheaper than from any other source.

When some roughness as prairie hay or timothy hay is fed and corn is worth about thirty-five cents per bushel and cotton seed meal twenty-four dollars per ton, a very profitable grain ration to feed is twenty to twenty-five percent of cotton seed meal and the remainder of the ration to consist of shelled corn, corn meal or corn and cob meal. This ration contains enough protein to make a balanced ration, and with the above prices it can be fed with profit to cattle that are good feeders.

If the cattle have not been used to cotton seed meal it is the

best policy to start them with a very small amount of this concentrated food, about one pound per day at first and gradually increase the amount until in three weeks, one-fourth or one-fifth of the ration may consist of this meal, and fed with safety.

On this sort of feed the cattle should show a rapid increase in weight, and experience has proven that cattle fed on this sort of feed give more satisfactory results than when corn was fed exclusively as a grain ration. Not only are gains made faster but the quality of beef produced is superior in quality than gains made with corn alone. In some localities where corn is not raised very extensively or where it is too high in price to warrant the feeding of it to fattening cattle, the practice of fattening them on cotton seed meal alone is a common practice and good results are obtained. This method is practiced to quite an extent in the south today. ✓

The writer is acquainted with a large cattle feeder who has fattened several car loads of cattle on cotton seed meal, with alfalfa, clover and timothy hay as a roughage. The steers were fed only a pound of grain apiece for a few days, when the amount was gradually increased until they were fed all they would clean up good so none was left in the feed trough to mould and ferment. They were fed this feed for ninety days, and with the exception of one steer, which acted as though he had the blind staggers, no bad results were obtained from feeding this sort of a feed. This feeder recommends cotton seed meal very highly as a feed for fattening cattle, and states that when corn is worth fifty cents per bushel it is more profitable to feed cotton seed meal alone than to feed one-half corn. But when corn is worth thirty-five cents per bushel, it is better to feed one-fourth cotton seed meal and three-fourths corn. This ration produces larger and more economical gains than either

cotton seed meal or corn meal alone.

The cotton seed meal fed in the stock feeding above spoken of, was bought directly from the oil mills by the car load and was of an excellent quality, and was not allowed to get old or mould before being fed. He also states that the cattle were fed only what they would clean up readily, so none was allowed to remain in the feeding troughs to ferment.

Hogs were allowed to run in the same lot that the cattle were fed in, and no bad results were obtained as has been reported in some cases when hogs are in the same lot as cattle fed cotton seed meal. This would tend to prove that a small ration of cotton seed meal may be fed hogs without serious results.

In the same locality in which the above spoken of cattle feeder lives there are three other large cattle feeders who annually feed large quantities of cotton seed meal to cattle. Sometimes they feed it exclusively as a grain ration, at other times when the price of corn is rather high, about 40 cents per bushel, they make a ration consisting of both cotton seed meal and corn. These men have been in the cattle business for many years and are very prosperous feeders. This alone would seem to be enough to warrant the feeding of this protein feed to fattening cattle.

Quite a large number of experiments have been carried on with cotton seed meal as a cattle food, some of which will be given below. At the Iowa experiment station four years ago, twenty steers were fed corn, cotton seed meal and wheat straw. At the beginning of the experiment they were fed fifteen pounds of snapped corn and one-eighth pound of cotton seed meal. After forty two days feeding, the cattle were eating twenty-five pounds of corn and cob meal and two and one-half pounds of cotton seed meal per head per day.

At this time they were very suddenly affected, three of the animals dying and the rest going blind and refusing to eat, so they were marketed.

A post mortem examination revealed the fact that the stomachs of the animals were very much inflamed, being red and blue in color.

At the time the cattle were affected they were only getting 2 1/2 pounds of cotton seed meal per head per day, while at the same station five pounds per head per day has been fed without serious results. The only way in which the trouble may be accounted for is that it was fed with corn and cob meal, and wheat roughage, making a very large bulk. The trouble must have been from some other source other than the cotton seed meal.

In 1903 another experiment was conducted with cotton seed meal at the same station, in comparison with oil meal, gluten feed and dried blood. In this experiment fifty steers were fed in each lot.

Each steer in the oil meal lot was given 1/5 lb. oil meal in addition to the corn ration at first. The oil meal was gradually increased until the steers were getting 4 lbs. at the end of the feeding period.

Each steer in the gluten feed lot received 1/5 lb. of gluten feed per head per day. This amount was gradually increased until the steers were getting 5 lb. per head per day.

Lot 5 received 1/6 lb. of dried blood in addition to the corn ration. The dried blood was increased 1/15 to 1/25 of a pound per head per day until at the end of the experiment they were receiving 1.5 lbs. per head per day.

Lot 3 receiving the cotton seed meal was not placed in the experiment until one month after the experiment began on account of not being able to get cotton seed meal.

This lot was started with  $1/8$  of a pound per head per day and increased about  $1/25$  of a pound per day until they were eating 4 lbs. of cotton seed meal per head per day in addition to the corn ration. The feeding experiment lasted for one-hundred and eighty-nine days when they were sold for fat cattle. This lot made the best gains of any lot fed.

The lot receiving the cotton seed meal made a gain of 1.87 pounds per day. Both lots were in better bloom than lot 1 which was fed snap corn the first part of the experiment afterwards changing to shelled corn. Although the lot receiving cotton seed meal and oil meal were not fed with as much economy as lot 1 ~~but~~ ~~they brought~~ they brought a higher price on the market on account of being in better bloom.

On comparing lots two and three we find that lot three which received the cotton seed meal made cheaper gains than the one receiving oil meal.

In summing up this experiment the station speaks very favorably of oil meal and cotton seed meal as a supplementary food for feeding cattle and is of the opinion that cotton seed meal is the more economical of the two.

Recent steer feeding experiments have been conducted at the Mississippi experiment station with cotton seed meal. The results will be given below. Twenty-five steers were divided into five lots. Lot 1 was fed in a stable and received a mixed ration of corn, bran, hay, hulls and cotton seed meal. Lot 2 also fed in a stable were fed a ration of cotton seed meal and hulls. Lot 3 was of a poor scrub character and were fed in a stable receiving the same feed as lot 1. Lot 4 was fed in an open yard without any shelter other than an open shed. Their ration was the same as that of Lots 1

and 3. Lot 5 was fed in an open yard without any shelter. Their feed consisted of cotton seed meal and hulls the same as Lot 2.

The hay fed during this period was Johnson grass and alfalfa.

The cattle were well accustomed to eating the above named feed before the experiment began so no detrimental effects were caused by not being used to the feed. They were fed twice a day for ninety-five days, care being taken that the feed troughs were thoroughly cleaned out each time before feeding.

The lots receiving cotton seed meal and hulls had their ration divided equally between two feeds i.e. thirteen to fifteen pounds of hulls to three or four pounds of oil meal each feed. Those receiving a mixed ration were given hulls in the morning and hay at night. During the first period of the experiment three pounds of cotton seed meal was fed with the hulls and two pounds each of corn meal and bran with hay. In the second period of the experiment two pounds each of cotton seed meal and bran were fed with the hulls and five pounds of corn meal with hay. In the third period the corn meal was fed at night and increased one pound daily up to ten pounds and two pounds of corn meal were fed in the morning alone with two pounds of cotton seed meal and bran, making a total of twelve pounds of corn meal per day.

The comparison of the two feeds viz. hay, corn meal, wheat bran and cotton seed meal, with cotton seed meal and hulls shows that for economical and reasonably rapid gains, cotton seed meal and hulls were considerably superior to the mixed feeds, but the conclusions are that if corn meal or corn had been added to the cotton seed meal and hulls the ration would have given more profitable results.

Lot 2 fed in the stable on cotton seed meal made the cheapest

gains. The average cost for the whole period was 6.1 cents for each pound of gain. Lot 1 made a net gain of \$19.79, Lot 2 \$59.46, Lot 3 \$3.71, Lot 4 \$11.26, Lot 5 \$48.65. Lots 2 and 3 show a considerable more profit than the other three lots.

The conclusions reached by this experiment and previous experiments conducted along the same line at the Mississippi station is that, where cotton seed meal and hulls can be purchased at a reasonable price, they prove to be very cheap feeds for fattening steers, and no bad effects have resulted from feeding cotton seed meal for such short periods as this.

With the above evidence in favor of cotton seed meal, it seems that there should be no hesitating in feeding it to fattening cattle. Although the practice of fattening cattle on this feed is quite common today, it will only be a short time until it will be more universally fed than it is today and greater will be the success of the cattle feeder.

#### Cotton Seed Meal for Horses.

Up to the present time very little experimenting has been done to determine the value of Cotton Seed Meal as a horse food. Oats are undoubtedly the favorite horse food, and best results are obtained when oats are fed to a horse that does heavy work. But at times oats cannot be bought at a price that would warrant the buying of them, and then is the time when some nitrogenous food must be added to the ration in order to produce a balanced ration. And cotton seed meal is a good feed to add to a carbonaceous feed such as corn to get the proper amount of protein, as it contains more protein pound for pound than any of our feeds in use today.

One great factor in favor of cotton seed meal is its cheapness. Protein is the most expensive part of a food, and is the part

which is most commonly lacking. No where can this important food principal be secured as cheaply as we can from cotton seed meal. So if it can be fed to horses without injurious effects it means a great saving to the horse feeder, and at the same time have a feed which will give nearly, if not quite as good results as oats.

In 1894 the North Carolina Experiment Station conducted an experiment with cotton seed meal on a couple of horses as follows: For ten days they were fed a ration consisting of clover chaff, corn meal and ship stuff. One horse lost and one gained during this period of the experiment. The ration will be given below which was fed.

During the second period both horses gained in weight, No. 1 at the rate of 1.6 pounds per day, and No. 2, 4.1 pounds per day. Before cotton seed meal was fed the gains fluctuated, but as soon as 2 pounds of cotton seed meal was substituted for 2 pounds of corn meal and ship stuff there was a regular advance in body weight. At the close of the second period, the corn and ship stuff was decreased one pound and the cotton seed meal increased one pound. The chaff was replaced by timothy hay. No. 1 refused to eat the hay and only ate the meal. He was discarded the 4th day. No. 2 refused to eat his hay after the 8th day and so the experiment closed. Neither horse, however, showed any symptoms to indicate that the cotton seed meal disagreed with them.

The rations fed and consumed are given below:

Horse No.1.	1st Period.		2nd Period.		3rd Period	
	Pounds Fed	Pounds Eaten	Pounds Fed	Pounds Eaten	Pounds Fed.	Pounds Eaten
Clover Straw (chaff)	18	17.8	17	16.44	9	
Ship Stuff	5	5	4	4	2	
Corn Meal	5	5	4	4	2	
Cotton Seed Meal	0	0	2	2	2.5	
Horse No. 2.						
Clover Straw (chaff)	18	16.46	17	17	9	
Ship Stuff	5	5	4	4	2	
Corn Meal	5	5	4	4	2	
Cotton Seed Meal	0	0	2	2	2.5	

From the above experiment only good results were obtained from feeding cotton seed meal. Gains were made quicker and much more cheaply than when cotton seed meal was not used.

At another time a similar experiment was carried on at the same station. This time the cotton seed meal was increased to 3.5 # per day without any injurious effects.

At the Louisiana station cotton seed meal was fed to horses and mules with good results. One or two pounds being fed per day.

In some cases, however, it has proven less satisfactory as a horse feed. This might have been owing to the fact that it was not as fresh and bright as it should have been, or that it had become musty with age or that too much was fed. As it is a very concentrated food 2# per day will be enough to furnish the required protein in addition to what will be found in the other feeds.

When fresh meal has been fed judiciously, about 2# per day, good results have been obtained.

Care should be taken not to allow any of the meal to remain in the feed boxes and ferment, or bad effects may result and we will want to discard a food which is very profitable as a horse feed.

#### Cotton Seed Meal for Hogs.

Corn is King of the hog feeding yard and always will be. Hogs cannot subsist upon dry fodder alone, and as corn is the most abundant and convenient feed, it is fed to hogs as a sale feed in many parts of the country. But investigations have proven that this is not the proper method of raising, and the method of raising hogs is rapidly changing and foods richer in protein are being sought for, in order that it may be fed with corn and thus produce a balanced ration. Balanced rations are more economical and healthful than an exclusive corn ration. This may be proven by the fact that each year after a large corn crop a great number of hogs are lost by the wide spread of cholera, also stock hogs which are fed on corn alone frequently become paralyzed and cause great losses.

When hogs have a free access to either an alfalfa or clover field this difficulty is overcome and hogs are more healthful and more resistant to disease, but pasture can only be provided for a portion of the year, and after this time some other protein food must be substituted, and the cheapest one on the market today is cotton seed meal.

But some of the past experiences with this food as a swine food do not show very favorable results, while in other cases excellent results have been obtained from the use of this concentrate. Most of the early experiments with this feed showed only detrimental

effects, and most of these experimenters reported that cotton seed meal acted as a poison when fed to hogs and that it could not be fed profitably. Yet they all seemed to agree that it did make cheap and quick gains, but when fed continually in very large amount it finally resulted in the death of the animal.

Just what there is in the meal that causes death, no one seems to be able to determine.

Some recent experiments conducted along this line have been very successful.

In November 1903, an experiment was carried on at the Kansas Station with cotton seed meal to determine its effects upon hogs. Twelve pigs, each weighing an average of 157 pounds were used in the experiment. These were divided into six lots, and fed the following ration: Lot 1, corn chop, seventy-five percent, oil meal, five percent, cotton seed meal, twenty percent. Lot 2, corn chop, eighty percent, one-fifth of a pint of raw linseed oil meal daily, cotton seed meal twenty percent. Lot 3, ground barley eighty percent, cotton seed meal twenty percent. Lot 4, corn chop, eighty percent, cotton seed meal twenty percent. Lot 5, Kafir corn, eighty percent, cotton seed meal, twenty percent. Lot 6, shorts, eighty percent, cotton seed meal twenty percent.

The above rations were fed in a thick slop after they had been thoroughly mixed. This feed was continued eleven weeks when the pigs were sold as fat hogs.

The following table gives total weights of each pig per week and total gain per lot:

Lot	Pig No.	date	date	date	date	date	date	date	date	date	date	date	date	date	date	date	date	Gain per pig	Gain per lot
1	157	11-23	11-30	12-7	12-14	12-21	12-28	1-4	1-11	1-18	1-25	2-2	71#	149#					
	129	171	185	182	189	203	210	215	230	230	236	241	78#						
2	162	157	168	175	175	196	200	205	217	221	241	240	83#	187#					
	128	181	195	202	208	223	247	243	260	275	280	285	104						
3	126	196	205	212	212	230	235	235	237	240	245	250	54#	119#					
	127	151	161	170	176	185	193	195	204	206	211	216	65						
4	155	174	193	193	205	215	221	232	240	250	245	255	81#	163#					
	120	175	190	195	196	215	227	232	240	250	211	257	82						
5	159	188	203	210	215	230	241	248	260	275	278	280	96#	159#					
	124	159	171	180	183	200	205	210	210	215	221	226	67						
6	153	189	200	209	211	225	241	241	240	255	260	262	73#	163#					
	109	175	183	194	194	210	221	226	245	257	260	265	90						

840

841

Lot 3 made the least gains and were not in very good condition at the end of the experiment.

The ground barley hulls made a bulky feed not relished by the hogs.

Lot 5 received old Kafir corn the first part of the experiment which was not of a very good quality. But when good Kafir corn was fed good results were obtained. The other lots that ate oil meal did well all through the experiment.

Each lot ate on an average twelve pounds of grain per day.

The following table gives the amount of grain consumed by each lot during the experiment, total cost of feed, and cost per 100 pounds gain:

Lot	Total gain lbs.	C. seed meal lbs.	Corn chop lbs.	Kafir meal lbs.	Barley lbs.	Shorts lbs.	Oil meal lbs.	Linseed meal qts.	Total cost.	Cost per 100 lbs. gain.
1	910	181	686				45		\$6.85	\$4.76
2	912	181	730					8	7.85	4.20
3	887	177			610				8.50	7.14
4	912	182	730						6.25	3.80
5	875	175		700					6.07	3.81
6	920	184				736			6.75	4.20

While there was but little difference in the amounts of grain consumed by each lot, the difference in the total cost was very different.

The lots four and five receiving corn and Kafir corn with cotton seed meal made much the cheaper gains.

The experiment was success all the way through. The pigs were not sick any time during the experiment, and no advantage was gained by feeding the high priced feeds as in lots 2,4, and 6.

In this experiment more cotton seed meal was fed than was necessary for a balanced ration. The nutritive ratio was from 1:32 to 1:5.4, while a ratio of 1:6.4 is a very good one for a fattening pig.

Thus less amounts of cotton seed meal could have been fed and thus lowered the cost of feed and there would have been less danger of loss from over feeding of cotton seed meal.

At the Texas experiment station recent feeding trials were made with feeding fermented cotton seed meal in slop. This experiment showed that when fermented cotton seed meal can be fed in quantities, and for a longer period than when fed with other feeds.

In this experiment forty hogs were fed, dividing them into four lots of ten each.

One lot was fed corn chop slop alone, which was fermented the same as the mixed. This was to compare with another one of the lots that was fed chops not fermented.

Another lot received one third cotton seed meal and two thirds corn meal fermented. And the other lot one half cotton seed meal and one half corn chop fermented. These feeds were not fed until they were thoroughly soured. This was done by first thoroughly mixing the feeds, then adding just enough water to cover the mixture. In warm weather it took only about twenty-four hours for the feed to become thoroughly soured but in winter it takes considerably longer. Souring is hastened if a quart of soured feed is mixed with the new mixture.

The hogs fed were mostly grade Poland China hogs of a good

grade, both sows and barrows.

The hogs in this experiment were confined in dry lots so received no green feed and had no natural shade, but some shelter was made of boards to protect the animals from the sun and heat.

At the beginning of the experiment on Monday morning one day's corn chops and cotton seed meal were weighed and placed in barrels and covered with enough water to insure fermentation. This feed was fed Tuesday evening and Wednesday morning. Feed for Wednesday night was prepared Tuesday morning. The corn chop mixture in all cases fermented the quickest, in about thirty-six hours. This was in April. In the summer when the weather was warmer twenty-four hours proved to be sufficient time to have water on the feed in order to make it sour properly.

It was the intention to feed the amount of cotton seed meal that has frequently caused death in other experiments.

For the first forty-five days the hogs ate  $2\frac{1}{2}$  pounds of grain each, about  $1\frac{1}{4}$  pounds cotton seed meal for lot 4, to hogs weighing one hundred and eighteen pounds. As no bad effects were noticed at the end of forty-five days, it was decided to increase the ration and see what heavier feeding would result in.

The feed was gradually increased until on May twenty-eighth, the sixty-third day of feeding the pigs, those in lot four were eating 7 pounds per day. But on account of the hot weather which followed for several days the feed was cut down so that death would not be caused by heat.

The feed eaten and results are given below:

Lot receiving Unfermented Corn Chops.

Number of hogs	10
Average weight at beginning of experiment	120.5

844

Total feed eaten	3080.
Total gain, pounds	404.
Average daily gains 1st 43 days	.38
Average daily gains last 40 days	.54 pounds
Pounds fed per pound gain	7.64
Cost per pound gain	8.4¢

Lot 2 Receiving Corn Chops, Fermented.

Number of hogs	10
Average weight at beginning of experiment	118.7 pounds
Total feed eaten, Chops lbs.	2805.
Total gains, pounds	323
Average daily gains, 1st 43 days	.28 pounds
Average daily gains last 40 days	.58 "
Cost per pound gain	8.4¢

Lot 3 Receiving 1/3 cotton seed meal and 2/3 Chops, Fermented.

Number of hogs	10
Average weight at beginning of experiment	123 pounds
Total feed eaten	
Cotton seed meal	920 "
Corn chops	1844 "
Total gain	380 "
Average daily gains 1st 43 days	.65 "
Average daily gains last 40 days	.38 "
Pounds fed per pound gain	7.27 "
Cost per pound gain	8.06¢

Lot 4 Receiving 1/2 cotton seed meal and 2/3 Corn Chops.

Number of hogs	10
Average weight at beginning of experiment	120 pounds
Total feed eaten	

845

Cotton seed meal	1331 lbs.
Corn chops	1455 "
Average daily gains 1st 43 days	.54 "
" " " last 40 days	.12 "
Pounds fed per pound gain	10 "
Cost per pound gain	11.1¢

This experiment seems to indicate that sound cotton seed meal can be fed in larger quantities and for a longer period than when fed in the ordinary way.

This experiment also shows that the mixture containing cotton seed meal gave larger and cheaper gains than corn fed hogs for the first forty-three days, but during the last forty days the results were reversed. This goes to show that it will pay to add cotton seed meal to a hog ration during the last forty days of the fattening period.

For animals on heavy feed it is best not to have more than one-fourth of the ration consist of cotton seed meal and that this amount be fed not more than fifty days or if the time for which it is desired to feed it is longer, the amount of feed should be proportionally reduced.

Previous to this experiment other experiments had been carried on at the same station with cotton seed meal fed in a dry form. In most cases after feeding it for about five weeks the hogs would begin to die. Yet in some cases hogs could be fed for a longer time without any serious results.

The writer has witnessed incidents where young pigs were fed small amounts of cotton seed meal, mixed with corn and water and fed as a slop. For a few weeks the young pigs did well, but they

soon began to die very rapidly and had the feeding of cotton seed meal not been stopped most all of the pigs would have very likely have died.

Several other experiments give the same results and it may be consented that cotton seed meal is not a profitable feed for young pigs.

Sows have been fed cotton seed meal at this station with success. When the pigs were farrowed, they were strong and healthy, and no bad results were obtained when the sows received the same feed after the pigs were farrowed.

At the Oklahoma experiment station in 1900 an experiment was carried on with cotton seed meal as a hog feed. About 1/5 of the ration of these pigs consisted of cotton seed meal.

They were fed thus for 126 days, with very good success. If the pigs showed signs of ill health the cotton seed meal was dispensed with for a week and then fed again. In this experiment very economical gains were produced.

While some of the experiments have not proven a success when cotton seed meal is fed, it has been proven that cotton seed meal and corn make quicker and larger gains than corn by itself. And when fed in small quantities not more than 1/5 of the ration to consist of this feed, it can be fed with profit and safety where the feeder will watch his hogs closely and stop the ration of cotton seed meal for a week if any detrimental effects are noticed, and then continue it again when the animal is all right. Or if it is not desirable to feed it dry it can be very economically and profitably fed when soured before fed as was done in the recent experiment at the Texas station.

### Conclusion.

It has been the intention of the writer to cite the above experiments and incidents in order to support his view that cotton seed meal may be fed with success to horses, hogs, fattening cattle and dairy cattle if in the hands of the feeder who has started feeding, and looks after his stock with care while they are getting accustomed to a new feed. Unless the feeder will look after his stock well it is not advisable for him to feed this feed or any other feed, but let him take such precautions as a good stockman will and he can raise and fatten his stock much cheaper with cotton seed meal than he can without it.

One point to bear in mind is to get cotton seed meal which is fresh and bright. Much damage is often caused by feeding meal which has become old and moulded or otherwise contaminated.

And again great care must be exercised in getting animals used to this feed. Only a very small portion should be fed at first and this gradually increased until the amount required is fed. The amount to be fed depends upon the time for which it is desired to feed this feed. If it is only to be fed only for a short period larger amounts may be fed than when it is desired to feed it for several months at a time.

As scientific work in stock feeding advances this feed will be more widely used and there is reason to believe that with the introduction of this feed that stockmen will have less trouble on account of loss of stock as with the introduction of this feed there will be a greater tendency to produce balanced rations, and balanced rations are more healthful and make animals more resistant to disease.