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Steer Feeding Experiments in the Black Belt of Alabama

By J. C. Grimes

AGRICULTURAL EXPERIMENT STATION
OF THE
ALABAMA POLYTECHNIC INSTITUTE

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Steer Feeding Experiments in the Black Belt of Alabama

By J. C. Grimes

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THE REGION AND ITS PROBLEMS

THE BLACK BELT constitutes a narrow strip of land averaging about thirty miles in width and extending through West Alabama and East Mississippi. It lies entirely within the coastal plain region but posseses certain physical characteristics that make it a region distinctly apart from the rest of the coastal plain insofar as agricultural practices and possibilities are concerned. Although this area is underlain with partially decomposed limestone, there are both lime and non-lime soils in the belt.

Before the advent of the boll weevil into Alabama about 1914, the Black Belt was a great cotton country and farmers relied on this crop almost exclusively for their income. Since 1914 the ravages of the boll weevil, the scarsity of labor, and the gradual spread of Johnson grass, which is used extensively as a hay crop on most farms, has made cotton production hazardous and as a rule unprofitable.

In recent years land owners have been turning their attention to the production of beef and dairy cattle and sheep. Fine pasture plants such as Bermuda grass, Dallis grass, white clover, black medic, sweet clover, bur clover, hop clover, and lespedeza grow luxuriantly in this section and furnish grazing from early spring to late fall; moreover, cheap winter feed can be provided in the form of Johnson grass hay, alfalfa hay and silage. This is, therefore, potentially the greatest cattle region in the southeastern states.

There is no well defined system of beef production practiced in the Black Belt. Some farmers own a cow herd from which they raise calves. The cows are wintered very largely on the range but in some cases they receive low grade Johnson grass hay and a small amount of cottonseed meal during extremely bad weather. Calves are sold in the fall either as vealers or to farmers in other states as stockers and feeders. Steer feeding resolves itself very largely into a grazing scheme, most people buying their steers in the spring and selling them in the fall. This system is practiced to such an extent that it has a tendency to create a cattle shortage on the local market at one season of the year and a flooded market at another, and to throw prices out of line during both seasons. Some far-seeing individuals take advantage of these conditions and buy young

*The author wishes to acknowledge his indebtedness to H. P. Shedd, E. Gibbens, and U. C. Jenkins for valuable cooperation and assistance in carrying out these experiments.

cattle in the fall. These cattle are wintered on cheap feeds and grazed the following summer or fed for 100 to 120 days on a heavy allowance of cottonseed meal and cottonseed hulls, or cottonseed meal, Johnson grass hay or silage and sold on the local markets as butcher cattle.

With a desire to secure authentic information which might be of service to cattle producers in the Black Belt, experiments were planned in 1925 for (1) fattening steers, (2) wintering stockers and feeders, (3) grazing steers. A cooperative arrangement was worked out with Kirkwood Plantation, Faunsdale, Alabama, for carrying out this experiment. This place contains approximately four thousand acres of fine grass and hay land and is located in the heart of the Black Belt. It is owned by Mr. H. P. Shedd of New York City and has been under the general supervision of Mr. E. Gibbens and Mr. U. C. Jenkins during the time of these experiments.

PART I—FATTENING STEERS

NUMEROUS farmers in the Black Belt make a practice of fattening a carload or more of steers each winter. As a general rule the ration used consists of cottonseed meal and cottonseed hulls, or cottonseed meal and low-grade Johnson grass hay. Occasionally blackstrap molasses is added to one of the above combinations. Corn and other grains which are employed extensively in fattening rations in some other parts of the United States are rarely ever used in Alabama on account of their scarcity and high price. The usual length of the fattening period in this territory is from 90 to 120 days; while cattle are not in prime condition under this system of management, they carry a moderate amount of flesh and meet with a good demand on southern markets.

Blackstrap molasses, besides being palatable and laxative, is a carbonaceous feed and has been used to some extent as a partial substitute for corn. Most of the molasses used for feed in the United States comes through the port of Mobile. Since the Black Belt is near the source of supply of molasses and since corn is too expensive to use as cattle feed in this territory, it was thought that molasses might prove to be an economical supplement to a ration of cottonseed meal and Johnson grass hay, especially since the meal is a high protein feed. With this idea in mind experiments were conducted in 1925, 1926, and 1927 with the object of determining the advisability of such a practice.

Plan of experiment:

Steers Used.—During each of the three years of this experiment high-grade Hereford steers were used. In 1925 the steers were three-year-olds, but in 1926 and 1927 they were two-year-olds. There were 25 steers in each lot the first year of the experi-

ment and 10 in each lot during the other two years. The cattle were raised on the farm where the experiment was conducted or on adjoining farms. At the beginning of each year's experiment the steers were divided into two lots as nearly equal as possible in age, size, conformation, and condition. Each steer in the experiment was tagged as a means of identification.

Weights.—Individual weights were taken on three consecutive days at the beginning and at the close of the experiment, and the averages of the three weights were taken as the initial and final weights, respectively. Individual weights were taken at 28-day intervals throughout the experiments. All weighings were begun about 9 a. m.

Shelter and Range.—Each group of steers had access to an open shed about 15 feet wide by 100 feet long with a southern exposure. A five-acre lot was connected with each shed, which allowed the cattle to remain in the open during nice weather. Water was provided by means of a lake or pond. Block salt was supplied throughout the experiment.

Feeds Used.—Lot 1 received cottonseed meal, blackstrap molasses and Johnson grass hay. Lot II received cottonseed meal and Johnson grass hay. The hay was of low grade and would probably have been classed as Number 2 on the market. It was fed in unlimited amounts but the meal and molasses were restricted to a certain number of pounds daily. Thirty-six per cent meal was used. At the beginning of the experiment the meal and molasses were both fed at the rate of one pound daily and increased gradually as the feeding period advanced. Steers were fed twice daily.

Valuation of Animals.—The animals were valued by an experienced buyer at the beginning of the experiment. The actual sale price of the animals on the farm was taken as the final valuation.

Price of Feeds.—Cottonseed meal was charged at $40 per ton, molasses at one and one-half cents per pound, and hay at $8 per ton. These prices are in line with the prevailing prices on the local markets during the three years of the experiment. No labor charge was made, nor was manure credited in calculating the financial returns of the experiment.

Results of first experiment with blackstrap molasses for fattening steers:

It will be noted from Table I that the addition of 3.29 pounds of blackstrap molasses daily to a ration of cottonseed meal and Johnson grass hay increased the rate of gain and the selling price of the steers. It also increased the feed cost. The steers in Lot I receiving molasses, cottonseed meal, and hay made an aver-

age daily gain of 1.74 pounds at a feed cost per hundred weight gain of $11.97, and sold on the farm at $7.50 per hundred weight.

Lot II gained 1.60 pounds daily at a feed cost per hundred weight gain of $10.23, and sold on the farm at $7.25 per hundred weight. The increase in the selling price of the molasses-fed steers in the experiment was not sufficient to offset the higher feed cost and the profit in this lot was $0.34 per steer as against $1.71 for the check lot.

Table I—Summary of First Experiment

December 10, 1925 to March 22, 1926—103 days

Feeds	Lot I Cottonseed meal, molasses, Johnson grass hay	Lot II Cottonseed meal, Johnson grass hay
Number steers in lot	25	25
Average initial weight per steer, pounds	739.32	739.96
Initial cost per steer at 6c per pound, dollars	44.36	44.40
Average final weight per steer, pounds	918.20	904.60
Average gain per steer, pounds	178.88	164.64
Average daily gain per steer, pounds	1.736	1.598
Average daily feed per steer		
Cottonseed meal, pounds	3.77	3.77
Molasses, pounds	3.29	———
Johnson grass hay, pounds	20.71	22.01
Feed per hundred weight gain		
Cottonseed meal	217.46	236.27
Molasses, pounds	189.74	———
Johnson grass hay, pounds	1193.00	1377.08
Total feed cost, dollars	535.13	421.12
Feed cost per hundred weight gain, dollars	11.97	10.23
*Selling price per hundred weight on farm, dollars	7.50	7.25
Total value of lot, dollars	1652.76	1574.00
Profit per steer above feed cost, dollars	.34	1.71

*Less 4% shrink in each lot.

Results of second experiment with blackstrap molasses for fattening steers:

The steers used in this test were lighter and somewhat younger than those used in 1925. The gains were not as good in either lot as those made by the steers during the previous year. The extremely cold winter during 1926 may have caused some difference in this respect. The results secured in both lots were somewhat disappointing.

From Table II it will be noted that the molasses-fed steers gained almost twice as rapidly during this test as the check lot and that the feed cost of a hundred pounds gain was also less and the finish better as indicated by the selling price of the two groups. Lot I made a daily gain of 1.27 pounds at a feed cost of $16.03 per hundred weight and sold for an average of $6.85 per hundred pounds. Lot II gained only .65 of a pound

daily at a feed cost of $22.46 per hundred pounds and sold for $6.50 per hundred pounds. The use of molasses in the ration proved profitable this year as Lot I returned a profit of $2.18 per steer and Lot II a profit of $1.03 per steer, a difference of $1.15 per steer in favor of the use of molasses.

Table II—Summary of Second Experiment

December 19, 1926 to April 9, 1927—112 days

Feeds	Lot I Cottonseed meal, molasses, Johnson grass hay	Lot II Cottonseed meal, Johnson grass hay
Number of steers in lot	10	10
Average initial weight per steer, pounds	607.60	579.40
Initial cost per steer at 4 cents per pound, dollars	24.30	23.17
Average final weight per steer, pounds	750.00	653.00
Average gain per steer, pounds	142.40	73.60
Average daily gain per steer, pounds	1.27	.65
Average daily feed per steer		
Cottonseed meal, pounds	3.77	3.77
Molasses, pounds	3.77	——
Johnson grass hay, pounds	17.93	18.03
Feed per hundred weight		
Cottonseed meal, pounds	297.00	574.45
Molasses, pounds	297.00	——
Johnson grass hay, pounds	1410.20	2744.00
Total feed cost, dollars	228.30	165.36
Feed cost per hundred weight gain, dollars	16.03	22.46
*Selling price per hundred weight, on farm, dollars	6.85	6.50
Total value of lot, dollars	493.20	407.47
Profit per steer above feed cost, dollars	2.18	1.03

*Less 4% shrink in each lot.

Results of third experiment with blackstrap molasses for fattening steers:

During the third experiment both lots of steers made fairly good gains. The molasses-fed group again made the largest gains and was fatter at the close of the test as shown by the selling price of the two lots of steers, but the feed cost of a hundred pound gain was also greater in this lot.

Table II shows that steers in Lot I gained an average of 1.64 pounds daily at a feed cost of $13.85 per hundred weight and sold for $10.50 on the farm. Lot II gained 1.40 pounds daily at a feed cost of $12.28 and sold for $9.50 on the farm. The profit per steer in Lot I was $6.12 and in Lot II, $2.07. One hundred pounds of molasses replaced 18 pounds of cottonseed meal and 141 pounds of Johnson grass hay in the production of 100 pounds gain.

Table III—Summary of Third Experiment

December 18, 1927 to April 7, 1928—112 days

Feeds	Lot I Cottonseed meal, molasses, Johnson grass hay	Lot II Cottonseed meal, Johnson grass hay
Number of steers in lot	10	10
Average initial weight per steer, pounds	627.90	627.20
Initial cost per steer at 8c per pound, dollars	50.23	50.18
Average final weight per steer, pounds	811.90	783.90
Average gain per steer, pounds	184.00	156.70
Average daily gain per steer, pounds	1.64	1.40
Average daily feed per steer		
Cottonseed meal, pounds	4.69	4.69
Molasses, pounds	4.50	-------
Johnson grass hay, pounds	16.566	19.51
Feed per hundred weight gain, pounds		
Cottonseed meal, pounds	285.30	335.00
Molasses, pounds	273.00	-------
Johnson grass hay, pounds	1008.30	1394.45
Total feed cost, dollars	254.82	192.40
Feed cost per hundred weight gain, dollars	13.85	12.28
*Selling price per hundred weight on farm, dollars	10.50	9.50
Total value of lot, dollars	818.39	714.91
Profit per steer above feed cost, dollars	6.12	2.07

*Less 4% shrink in weight.

Discussion of three years' results in using blackstrap molasses for fattening steers:

A summary of the results of the three experiments in using blackstrap molasses as a supplement to cottonseed meal and Johnson grass hay for fattening steers indicates that steers will make fairly good gains on hay and meal alone. This ration should not be expected to put steers in prime condition during a feeding period of 90 to 120 days, but should give them sufficient finish so they will meet with good demand on the southern markets.

In the three experiments 100 pounds of molasses replaced 22.19 pounds of cottonseed meal and 152 pounds of Johnson grass hay in producing 100 pounds gain. The use of molasses at prevailing prices was profitable during two of the tests but was fed at a slight loss during the winter of 1925.

In these experiments hay was fed in a rack and the molasses poured over the meal in the trough. The molasses would probably have shown better results if the roughage had been in such condition that it could have been mixed with the meal and molasses as this would have caused a greater consumption of roughage which was the cheap part of the ration.

PART II—WINTERING STEERS IN THE BLACK BELT

JOHNSON grass hay is plentiful and cheap on most Black Belt farms. It is used extensively as a roughage in wintering breeding cattle and stocker steers. Quite frequently hay constitutes the sole winter feed for such cattle but in some instances it is supplemented with a small amount of cottonseed meal.

In order to secure authentic information on the wintering of two-year-old steers in the Black Belt an experiment was planned in 1926 which has extended through the past three winters. The objects of the experiment were: (1) to determine the efficiency of Johnson grass hay alone for wintering steers, and (2) to determine the advisability of supplementing Johnson grass hay with a small amount of cottonseed meal for wintering steers.

Plan of experiment:

Steers Used.—The steers used in these experiments were high grade Herefords. Most of them were raised on the farm where the experiments were conducted, but a few were purchased from neighboring farms. They were long yearlings and short two-year-olds. There were 10 steers to each lot during the first two experiments and 25 steers to each lot during the third experiment. At the beginning of each year's test the steers were divided into two uniform groups.

Weights.—Steers were tagged as a means of identification. Individual weights were taken on three consecutive days at the beginning of the experiment and the average of the three considered as the initial weight. Individual weights were taken at 28-day intervals throughout the experiment. At the end of the experiment individual weights were taken and the steers regrouped and placed in a grazing experiment.

Shelter and Range.—Each group of steers had access to a good cattle barn opening into a lot of approximately five acres. Feeds were placed in the troughs and mangers and the steers were free to go into the barn at will. Water was supplied by a pond in each lot. Block salt was kept in the troughs throughout the experiment.

Feeds Used.—Lot 1 received Johnson grass hay self-fed and Lot II Johnson grass hay and a small amount of 36 per cent cottonseed meal. The meal was fed each morning. At the beginning of the experiment one pound of meal was allowed daily; the amount was gradually increased to about three pounds daily. Cottonseed meal was charged at $40 per ton and Johnson grass hay at $8 per ton.

Results of first experiment in wintering steers:

From Table IV it will be seen that steers in Lot I wintered well on Johnson grass hay alone, making an average daily gain of .30 of a pound. They consumed 19.24 pounds of hay per

Table IV—Summary of First Experiment

December 19, 1926 to April 9, 1927—112 days

Feeds	Lot I Johnson grass hay	Lot II Johnson grass hay, cottonseed meal
Number of steers in lot	10	10
Average initial weight per steer, pounds	474.30	484.90
Total initial cost of lot @ 4 cents, dollars	189.72	193.96
Average final weight per steer when turned on grass, pounds	508.00	545.00
Average gain per steer, pounds	33.70	60.10
Average daily gain per steer, pounds	.30	.536
Average daily feed per steer		
Cottonseed meal, pounds	------	2.00
Johnson grass hay, pounds	19.24	19.21
Total feed cost of wintering, dollars	86.22	131.02
Feed cost per head to winter, dollars	8.62	13.10
Total cost of steers when turned on grass, dollars	275.94	324.98
Cost per hundred weight when turned on grass, dollars	5.43	5.96

head daily and the feed cost of wintering was $8.62 per steer. Steers in Lot II consumed 19.21 pounds of hay per head daily and in addition were allowed an average of 2.00 pounds of meal each day. They gained .54 pounds daily and the feed cost of wintering was $13.10 per steer. The addition of meal to this lot increased the wintering cost $4.48 per steer.

The steers were valued at $4 per hundred weight in the fall. After adding the feed cost of wintering in each lot it was found that the steers in Lot I would have to be sold for $5.43 per hundred weight in order to break even, and those in Lot II would have to be sold for $5.96. The use of meal did not prove profitable in this test.

Table V—Summary of Second Experiment

December 18, 1927 to April 7, 1928—112 days

Feeds	Lot I Johnson grass hay	Lot II Cottonseed meal, Johnson grass hay
Number of steers in lot	10	10
Average initial weight per steer, pounds	602.10	618.80
Total initial cost at 8c per lb., dollars	481.68	495.04
Average final weight per steer, pounds	578.20	685.80
Average gain or loss per steer, pounds	23.90 loss	67.00
Average daily gain per steer, pounds	.21 loss	.598
Average daily feed per steer		
Cottonseed meal, pounds		2.12
Johnson grass hay, pounds	22.42	20.58
Total feed cost of wintering, dollars	100.47	139.79
Feed cost per head to winter, dollars	10.04	13.98
Total cost of steers when turned on grass, dollars	582.15	634.83
Cost per hundred weight when turned on grass, dollars	10.07	9.26

Results of second experiment in wintering steers:

By referring to Table V it will be noted that the steers in Lot I, fed Johnson grass hay alone, lost .21 of a pound daily. Each steer consumed 22.42 pounds of hay daily and the feed cost of wintering was $10.04 per head. The steers in Lot II gained .60 of a pound daily. They consumed 2.12 pounds of cottonseed meal and 20.58 pounds of hay per head daily. The feed cost of wintering per head was $13.98. The addition of 2.12 pounds of cottonseed meal per head daily to the hay ration increased the cost of wintering $3.94 per steer. It proved economical, however, as is shown by the fact that the steers in Lot II cost $0.81 per hundred weight less when turned to grass than did those in Lot I.

Results of third experiment in wintering steers:

The steers used during 1928-1929 were somewhat younger than those of the two previous experiments. The test was also started about ten days earlier this year and the steers were probably in better condition at the beginning of the experiment than were those of the two previous tests. This may explain the relatively poor showing made by the animals this year.

By referring to Table VI it will be seen that both lots of steers lost in weight, Lot I losing 87.4 pounds per head during the 112 days and Lot II losing only 1.2 pounds per head. The amount of hay consumed this year was much less than that of the two previous years, being 13.41 pounds daily in Lot I and 13.18 pounds daily in Lot II. In addition the steers in Lot II consumed an average of 1.75 pounds of cottonseed meal daily. The feed cost per head to winter was $6 in Lot I and $9.82 in Lot II. The addition of 1.75 pounds of cottonseed meal daily to the hay ration increased the cost of wintering $3.82 per steer. It was economical, however, as is shown by the fact that the steers which received meal cost $1.23 per hundred weight less when turned to grass than did those wintered on hay alone.

Table VI—Summary of Third Experiment

December 8, 1928 to April 2, 1929—112 days

Feeds	Lot I Johnson grass hay	Lot II Johnson grass hay, cottonseed meal
Number of steers in lot	25	25
Average initial weight per steer, pounds	600.64	607.60
Total initial cost @ 10c per pound, dollars	1501.60	1519.00
Average final weight per steer, pounds	513.20	606.40
Average gain or loss per steer, pounds	87.40 loss	1.20 loss
Average daily feed per steer		
Cottonseed meal, pounds	——	1.75
Johnson grass hay, pounds	13.41	13.18
Total feed cost of wintering, dollars	150.22	245.62
Feed cost per head to winter, dollars	6.00	9.82
Total cost of steers when turned on grass, dollars	1651.82	1764.62
Cost per hundred weight when turned on grass, dollars	12.87	11.64

Discussion of three years' results of wintering steers:

The three year's results of this experiment indicate that two- and three-year-old steers can be wintered in a fairly satisfactory manner on Johnson grass hay alone. The older the steers the less is the necessity for adding a protein supplement to the hay. Young steers such as those used in experiment three lost heavily on the hay ration alone.

Steers in Lot I which received hay alone gained 33.7 pounds per head during the winter of 1926 but lost 23.9 pounds per head in 1927 and 87.4 pounds per head in 1928.

Steers in Lot II which received an average daily allowance of 1.89 pounds of cottonseed meal in addition to hay gained 60.1 pounds each in 1926 and 67 pounds each in 1927. In 1928 each steer lost 1.2 pounds. The cost of wintering was increased $4 per steer by the addition of the meal.

Considering both the rate of gain and the feed cost it was profitable to use meal during two of the experiments.

PART III—FEEDING COTTONSEED MEAL TO STEERS ON GRASS

THE Black Belt is an excellent grass country and many steers are fattened on pasture in this territory each year. Steers make rapid and cheap gains on pasture and will usually return a fair profit if they can be sold for as much per hundred weight in the fall as they cost in the spring.

In this territory steers are wintered on cheap roughage, run on pasture during the following summer and sold as grass-fat animals in the fall. The better grade of steers are sold to feeders in other states where they are finished on grain. The lower grade animals are sold direct to the butcher.

In 1908 and 1909 Gray and Ward[1] conducted two tests in feeding cottonseed cake to steers on grass. They found that the use of cake increased the rate of gain, the selling price and the profits. The conditions under which these tests were conducted would probably not be typical of Black Belt conditions of today. During that time much of Alabama was infested with the cattle tick. The cattle were of much lower grade and the pastures were not as good as they are today.

Barnett and Goodell[2] report an experiment in feeding cottonseed meal to steers on grass. They found that the addition of meal slightly increased the rate of gain and the selling price per hundred weight but the greater cost in the meal-fed lot more than offset the advantages gained.

In order to secure further information on the economy of feeding cottonseed meal to steers that were being fattened on grass for the summer market an experiment was started in 1927 which was continued for three years.

Plan of experiment:

Steers which had been wintered according to the plan reported in Part II of this bulletin were regrouped at the end of the wintering period and placed on a good Black Belt pasture composed mostly of black medic, Dallis grass, white clover, Johnson grass and Bermuda grass. Lot A received cottonseed meal while on pasture and Lot B received pasture alone. The cattle were sold in June in order to get them on the market at a season of the year when the price of good cattle is usually at the highest peak. Both lots of steers had an abundance of pasture at all times.

Results of first experiment in feeding cottonseed meal to steers on grass:

From Table VII it will be seen that steers in Lot A received an average allowance of 4.73 pounds of meal daily and made a daily gain of 2.53 pounds. The total feed and pasture cost of this lot was $78.80. The cost per hundred weight gain was $4.45 and the profit per steer $12.70.

The steers in Lot B, on pasture only, gained an average of 1.7 pounds daily at a total cost of $12.50 and a cost per hundred weight gain of $1.05. The profit per steer in this lot was $9.40.

The cottonseed meal lot was fatter at the close of the experiment as indicated by the selling price of $7.53 per hundred weight in Lot A as against $6.61 in Lot B.

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(1) Ala. Exp. Sta. Bul. 151.

(2) Miss. Exp. Sta. Circ. 50.

Table VII—Summary of First Experiment
April 8 to June 18, 1927—70 days

Ration	Lot A Pasture and Cottonseed meal	Lot B Pasture only
Number steers in lot	10	10
Average weight per steer, pounds	527.00	526.00
Cost per hundred weight of steers when turned on grass, dollars	5.75	5.74
Average weight per steer at close of experiment, pounds	704.00	645.00
Average gain per steer on pasture, pounds	177.00	119.00
Average daily gain per steer on pasture, pounds	2.53	1.70
Cottonseed meal consumed on pasture pounds	3,315.00	
Daily meal allowance per steer, pounds	4.73	
Pasture charge at 50c each per 28 day period, dollars	12.50	12.50
Feed and pasture charge, dollars	78.80	12.50
Feed and pasture cost per hundred weight gain, dollars	4.45	1.05
*Selling price per hundred weight on farm, dollars	7.53	6.61
Profit per steer, dollars	12.70	9.40

Cottonseed meal charged at $40.00 per ton.
*Less 4% shrink in weight.

Results of second experiment in feeding cottonseed meal to steers on grass:

The results secured this year differed somewhat from those of the previous year. The steers on pasture alone gained almost as rapidly as those receiving meal. The daily gains in Lot A

Table VIII—Summary of Second Experiment
April 7 to June 16, 1928—70 days

Ration	Lot A Pasture and Cottonseed meal	Lot B Pasture only
Number of steers in lot	10	10
Average weight per steer, pounds	633.80	630.20
Cost per hundred weight when turned on on pasture, dollars	9.62	9.63
Average weight per steer at close of experiment, pounds	815.40	808.30
Average gain per steer on pasture, pounds	181.60	178.10
Average daily gain per steer on pasture, pounds	2.59	2.54
Cottonseed meal consumed, pounds	3,360.00	
Daily meal allowance per steer, pounds	4.80	———
Pasture charge 50c each per 28 day period, dollars,	12.50	12.50
Feed and pasture charge, dollars	79.70	12.50
Feed and pasture cost per hundred weight gain, dollars	4.39	.70
*Selling price per hundred weight on farm, dollars	10.25	10.25
Profit per steer, dollars	11.29	17.60

Cottonseed meal charged at $40.00 per ton
*Less 4% shrink in weight.

were 2.59 pounds and Lot B, 2.54 pounds. The feed cost of a hundred pounds gain was $4.39 in Lot A, and only $0.70 in Lot B.

There was no appreciable difference in the finish of the two lots of steers at the close of the test, both groups selling at $10.25 per hundred weight. The meal-fed steers returned a profit of $11.29 each and the pasture alone group $17.60 each.

Results of third experiment in feeding cottonseed meal to steers on grass:

The steers used in this experiment were valued at $10.00 per hundred weight the previous fall. When the winter feed bill was added the cost ran up to slightly more than $12 per hundred weight at the beginning of the grazing season. The steers had wintered rather poorly but after being turned on grass they made rapid gains and returned a fair profit despite the fact that they were sold for more than a cent a pound less than they had cost in the spring.

The results secured this year were in agreement with those of 1927 in that it was highly profitable to feed cottonseed meal to steers while on pasture. Steers in Lot A receiving four pounds of meal daily made an average daily gain of 2.46 pounds at a feed cost of $3.97 per hundred weight. They were in fine finish at the end of 13 weeks on pasture. They sold for $11 per hundred weight and returned a profit above feed and pasture cost of $6.52 per steer.

Lot B, which received no meal while on pasture, gained only 1.62 pounds daily. They sold for $10.50 per hundred and returned a profit of only 44 cents per steer.

Table IX—Summary of Third Experiment
March 30, 1929 to June 29, 1929—91 days

Ration	Lot A Pasture and Cottonseed meal	Lot B Pasture only
Number of steers in lot	14	14
Average weight per steer, pounds	561.80	560.40
Cost per hundred weight of steers when turned on pasture, dollars	12.03	12.36
Average weight per steer at close of experiment, pounds	786.00	707.80
Average gain per steer on pasture, pounds	224.20	147.40
Average daily gain per steer on pasture pounds	2.46	1.62
Cottonseed meal consumed on pasture, pounds	5,096.00	----------
Daily meal allowance per steer, pounds	4.00	----------
Pasture charge at 50c per 28 day period, dollars	22.75	22.75
Feed and pasture charge, dollars	124.67	22.75
Feed and pasture cost per hundred weight gain, dollars	3.97	1.10
*Selling price per hundred weight on farm dollars	11.00	10.50
Profit per steer, dollars	6.52	.44

Cottonseed meal charged at $40 per ton
*Less 4% shrink in weight.

Discussion of three years' results of feeding cottonseed meal to steers on grass:

The three years' results of this experiment indicate that it is profitable to feed cottonseed meal to steers on grass. The 1928 experiment was an exception, however, as the steers receiving no meal gained almost as rapidly and returned a greater profit than the meal-fed group.

In 1927 the use of 4.73 pounds of meal daily increased the daily gains .83 of a pound and the selling price $0.92 per hundred weight. The profit was increased $3.30 per steer. In 1929 the use of four pounds of meal daily increased the daily gains .84 of a pound and the selling price $0.50 per hundred weight. The profit from the use of meal was $6.08 per steer.

The prevailing price charged for good pasture in the Black Belt is about $0.50 per steer per month. At this rate steers will make very cheap gains on grass. During the three years of this experiment the cost of making a hundred pounds of gain from steers on grass alone ranged from $0.70 in 1928 to $1.10 in 1929. In 1927 the cost was $1.05. When an average of 4.5 pounds of cottonseed meal daily was added to the pasture ration the cost was increased to $4.21 for each hundred pounds of gain made.

As a general rule the market price for good cattle reaches the highest peak of the year during the summer months. One of the main advantages to be derived from feeding cottonseed meal to steers on grass is to get them ready for this high market.

EFFECT OF WINTER FEED ON GAINS MADE BY STEERS THE FOLLOWING SUMMER

TABLE X shows that 34 steers wintered on Johnson grass hay alone lost an average of 35.2 pounds each during the winter and gained 183.6 pounds each during the following 78 days on pasture. The total gain for both winter and summer was 148.4 pounds per steer.

Thirty-four steers which received approximately 1.9 pounds of cottonseed meal daily in addition to Johnson grass hay during the winter period gained 37.6 pounds per steer during the winter and 163.2 pounds per steer during the following 78 days on pasture. The total gain for both winter and summer was 201 pounds per steer.

From the above figures it will be seen that steers wintered on Johnson grass hay alone made more rapid gains on pasture than did the animals which were in a higher state of condition. The greatest total gains for the combined winter and summer periods, however, were made by the steers which received cottonseed meal in addition to Johnson grass hay during the winter. These results indicate that it is an uneconomical practice to allow steers to lose heavily in flesh during the winter since a con-

siderable part of the following summer will be required for them to regain this lost weight.

Table X—Showing Effects of Winter Feed on Gains Made by Steers the Following Summer and Total Gains Winter and Summer

(Winter period 112 days—Summer period 78 days)

Lot No.	*Winter ration	Year	Gain per steer Winter	Gain per steer Summer	Total	No. animals
I	Johnson grass hay	1926-27	33.7	152.0	185.7	10
	Johnson grass hay	1927-28	24.0 loss	204.5	180.5	10
	Johnson grass hay	1928-29	92.7 loss	191.3	98.6	14
		Average	35.2 loss	183.6	148.4 total	34
II	Johnson grass hay and cottonseed meal	1926-27	59.8	144.0	203.8	10
	Johnson grass hay and cottonseed meal	1927-28	67.0	155.0	222.0	10
	Johnson grass hay and cottonseed meal	1928-29	0.8	183.0	183.8	14
		Average	37.6	163.2	200.8 total	34

*Half of the steers from each of the Lots I and II received cottonseed meal on grass the following summer and the remaining half from each lot were on pasture alone.

SUMMARY

I.—Fattening steers in the winter to be sold in March or April:

1.—Steers fattened on cottonseed meal and low-grade Johnson grass hay returned a small profit above feed cost.

2.—The addition of three and one-half to four pounds of blackstrap molasses daily to a cottonseed meal and Johnson grass hay ration proved profitable in this experiment.

3.—Steers in Lot II receiving cottonseed meal and Johnson grass hay made an average daily gain of 1.38 pounds at a feed cost per hundred weight gain of $12.13 and returned a profit above feed cost of $1.64 per steer.

4.—Steers in Lot I receiving blackstrap molasses in addition to cottonseed meal and Johnson grass hay made an average daily gain of 1.61 pounds at a feed cost per hundred weight gain of $13.16 and returned a profit above feed cost of $2.03 per steer.

5.—Steers which received molasses had slightly more finish at the close of the feeding preiod as indicated by an increased selling price of $0.39 per hundred weight. The average selling price per hundred weight over the three-year period was $7.29 in Lot I and $7.68 in Lot II.

6.—A large amount of low-grade Johnson grass hay was marketed at a satisfactory price on the farm where it was raised by feeding it to steers.

II.—Wintering steers to be finished on grass the following spring:

1.—Steers wintered on a ration of low-grade Johnson grass hay alone lost on the average 46.4 pounds per head during the 112 days wintering period but were in a strong vigorous condition when turned on grass.

2.—Steers wintered on low grade Johnson grass hay plus an average of 1.89 pounds of cottonseed meal daily gained on the average 27.6 pounds per head during the 112-day wintering period.

3.—The average cost of wintering per steer for a period of 112 days was $7.49 on hay alone and $11.48 on hay and meal.

4.—The average initial cost of all steers per hundred pounds was $8.43. At the close of the wintering period it was found that the steers wintered on hay alone would have to sell for $10.59 per hundred weight to break even, and those on hay and meal would have to sell for $9.92. This indicates that it was profitable to use meal.

III.—Feeding cottonseed meal to steers being finished on grass for the June market:

1.—The feeding of 4.5 pounds of cottonseed meal daily to steers running on a good pasture proved profitable in this experiment.

2.—Steers finished on grass alone and sold in June made an average daily gain over a 77-day period of 1.92 pounds. The average cost for each hundred pounds of gain was $0.95 and the profit per steer was $8.11.

3.—Steers receiving 4.5 pounds of cottonseed meal while running on a good pasture made an average daily gain of 2.52 pounds at a feed cost of $4.21 per hundred pounds gain and returned a profit of $9.74 per steer.

4.—Results of the three years' experiment indicate that it is more profitable to winter steers on cheap feeds and finish them on grass for the summer market than it is to fatten them in the winter and market them in March or April.

5.—The profit above feed cost of steers fattened in the winter ranged, on the average, from $1.64 to $2.03 per head. The profit above feed and pasture cost of steers finished on grass ranged from $8.11 on grass alone to $9.74 on grass plus cottonseed meal.