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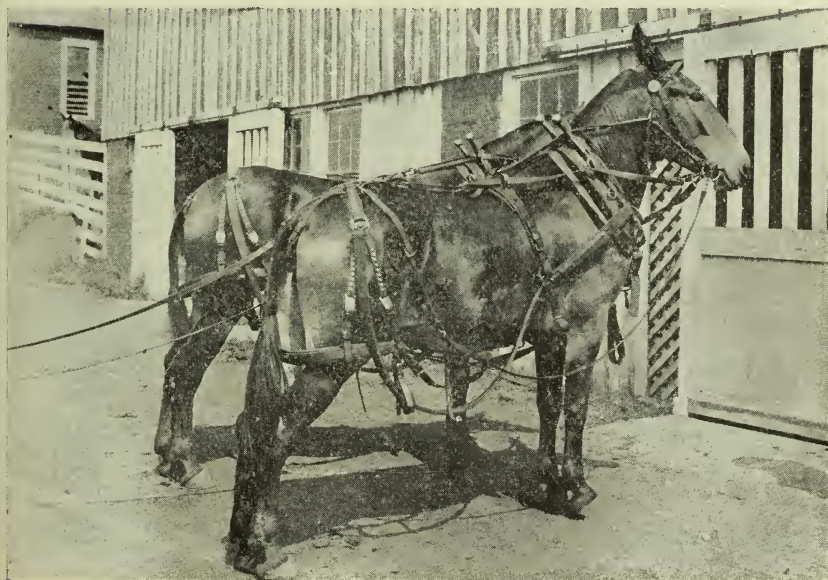
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Agricultural Experiment Station
Agricultural College, Miss.

Bulletin No. 176

The Economy of Mule Production
in the South and
Methods of Management



By H. K. GAYLE AND E. R. LLOYD
Agricultural College, Miss.
April 1916

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* In co-operation with U. S. Department of Agriculture.

The Economy of Mule Production in the South and Methods of Management

By H. K. GAYLE AND E. R. LLOYD

INTRODUCTION

The farm value of horses and mules in the United States is greater than the combined value of beef cattle, sheep, and swine. In Mississippi the farm value of horses and mules is one and three-fifths times as great as the total value of all dairy cattle, beef cattle, sheep, and swine, the total value of mules in this State being one-third greater than the total value of horses.

A number of estimates have been made to determine what per cent of the number of mules in Mississippi have been bred and raised within the State and their average indicates that not more than 20 or 25 per cent of the mules now at work in the State were raised in Mississippi. This percentage would show between 220,000 and 230,000 mules at work on the farms of this State that were shipped into Mississippi from outside sources, this representing between \$24,000,000 and \$25,000,000 spent for mules that could and should have been raised within the State at a good profit to the farmers producing them.

It is a significant fact that the most prosperous states of the Union are those states which are commonly looked upon as our livestock producing states. The permanent prosperity of any section can be fairly accurately measured by the relative number of livestock it is producing, and since this State has more money invested in horses and mules than in all other live stock combined, it becomes apparent that some study should be given to their production and management.

The statement is often made that the mule will do more work on a given amount of feed than the horse. Scientific data for the substantiation of this statement is lacking. However, it is generally agreed that the mule will stand hard work in hot weather better than the horse,

will stand more hard knocks and abuse, is freer from disease, longer lived, is less subject to lameness and digestive disorders, and is easier to handle in large bunches than the horse. For these reasons the mule has been practically the sole work animal for the Southern States, and in spite of the fact that in the last few years the use of farm tractors has increased rapidly, and will no doubt continue to increase, there is very little doubt but that for years to come the mule will continue to perform most of the operations on Southern farms.

This Station has for several years been conducting an experiment in the raising of mules, the object of which is:

First, To determine the economy of mule production under Mississippi conditions.

Second, To determine the best type of mare and jack for the production of good farm work mules.

Third, To study the relative hereditary influences of the jack and mare upon the mule produced.

The result of this work will be presented in this bulletin in such a way as to be of the most practical value to the farmer interested in the breeding and rearing of horses and mules. Data bearing on the more technical phases of breeding and feeding will be given in later publications.

THE ECONOMY OF MULE PRODUCTION UNDER MISSISSIPPI CONDITIONS AND METHODS OF MANAGEMENT

Following is a table of the feeds used and their average market price throughout the State:

Cottonseed Meal.....@ \$30.00 per ton.....	\$.015	per lb.
Ear Corn.....@ \$.75 per bu. ....	.0107	per lb.
Corn and Cob Meal..... (ground for 5c per bu).....	.0114	per lb.
Bran.....@ \$28.00 per ton.....	.014	per lb.
Oats@ \$.55 per bu.....	.0171	per lb.
Peanut cake@ \$24.00 per ton.....	.012	per lb.
Molasses@ 12c per gal. of 12 lb.....	.01	per lb.
Corn Silage@ \$3.00 per ton .....	.0015	per lb.
Johnson Grass Hay @ \$10.00 per ton .....	.005	per lb.
Peavine Hay@ \$12.00 per ton .....	.006	per lb.
Oat Straw@ \$5.00 per ton .....	.0025	per lb.

The mares used in the experiment were worked very little but were given free run of pasture while suckling colts and fed enough to keep them in good condition during the winter.

Starting with the mare after weaning her last colt, the mares are taken up from pasture about December 1st, each given a roomy box stall and fed twice daily. They have the run of open paddocks during the day, but at night and during inclement weather are kept in the stall.

The cost of wintering mares varies according to the weight of the mare and the feeds used. A ration of one pound of grain and one pound of hay per cwt., live weight, is a safe standard to follow. Oats and bran have been found too high in price to constitute a part of the ration for wintering a brood mare except near foaling time.

LOT 1, EXPERIMENT 1.

Two mares, averaging about 1000 lbs. in weight each, were wintered on a daily ration per mare of:

Ear corn	10 lbs.
Johnson Grass Hay	10 lbs.

These mares wintered in good shape at a cost to winter (120 days) of \$18.84 per mare.

LOT 2, EXPERIMENT 1.

Five mares, averaging about 900 lbs. in weight each, were wintered on a daily ration per mare of:

Corn and cob meal	2 lbs.
Cottonseed meal	2 lbs.
Silage	8 lbs.
Johnson grass hay	10 lbs.

These mares wintered in good shape at a cost to winter (120 days) of \$13.80 per mare.

LOT 1, EXPERIMENT 2.

Four Hackney mares, averaging about 1250 lbs. in weight each, were wintered on a daily ration per mare of:

Ear corn	6.3 lbs.
Cottonseed meal .....	.53 lbs.
Johnson grass hay	14.5 lbs.

These mares wintered in good shape at a cost to winter (120 days) of \$17.76 per mare.

LOT 1, EXPERIMENT 3.

Five Percheron mares, averaging about 1425 lbs. in weight each, were wintered on a daily ration per mare of:

Ear corn	9.5 lbs.
Cottonseed meal .....	.5 lbs.
Johnson grass hay	17.1 lbs.

The cost of wintering these mares (120 days) was \$23.16 per mare.

SILAGE

Silage has been successfully used for wintering brood mares and whenever used has lessened the cost of wintering the mare.

LOT 2, EXPERIMENT 2.

Seventeen light mares, averaging about 1100 lbs. in weight each, were wintered on a daily ration per mare of:

Ear Corn	5.6 lbs.
Cottonseed meal	1. lbs.
Silage	8. lbs.
Johnson grass hay	10. lbs.

These mares increased in weight about 50 lbs. each. The cost to winter (120 days) was \$16.44 per mare.

LOT 2, EXPERIMENT 3.

Seventeen grade draft mares, averaging in weight 1300 lbs. each, were wintered on a daily ration per mare of:

Ear corn	7. lbs.
Cottonseed meal	1.5 lbs.
Silage	10. lbs.
Johnson grass hay	10. lbs.

These mares increased in weight over 50 lbs. per mare. The cost to winter (120 days) was \$19.49 per mare.

THE SUCKLING COLT

It is desirable to have the colts dropped as early in the spring as possible. Not only will the colts make use of more feed and make a larger growth during the winter than if dropped late, but the mares will go into winter quarters in better shape and winter cheaper if some time is allowed to elapse between the time the colt is weaned and the time the mare is taken off pasture for the winter. During the month of March is a good time to have the colts dropped in this latitude.

Mares and colts are turned out to pasture about April 1st, and are allowed the freedom of good pasture together until October 1st,

when the colts are weaned and separated from the mares and the mares returned to pasture until December 1st.

THE WEANLING MULE COLT

When the colts are weaned October 1st, they are placed on a daily ration per colt of:

Corn and cob meal .....	.75 lbs.
Oats	1.5 lbs.

and run on a luxuriant pasture of winter oats until November 1st.

During this 30-day weaning period the colts will make an average gain of about 25 lbs. each, and will be on a full grain ration by November 1st.

It is very poor policy to economize on feed to a weanling or yearling mule colt. The mule at best is rather a poor grazer and a spare eater, and unless the colt is given all the palatable, nutritious feed it will consume, no matter how highly bred, it will never develop into anything more than an undersized, scrubby individual. The treatment a colt receives during the first two years of his life determines to a large extent his development, and for that reason he should receive only the best of care.

A weanling mule colt should receive at least 1 1-4 lbs. of grain and about 1 1-5 lbs. of hay per hundred weight of live weight as a daily ration.



Illustration showing the method of wintering mules in bunches under an open shed.

LOT 3, EXPERIMENT 1.

Five colts were fed 150 days on a daily ration per colt of:

Corn and cob meal.....	.5 lbs.
Cottonseed meal	1. lbs.
Silage	8. lbs.
Johnson grass hay	5. lbs.

This gave a ration equivalent to .33 lbs. of grain and 2 lbs. of hay per cwt. live weight, and the daily gain was only 6 lbs. per colt, the cost to winter being \$8.55 per colt.

LOT 4, EXPERIMENT 1.

Four colts were fed 150 days on a daily ration per colt of:

Ear corn	2.5 lbs.
Cottonseed meal	1. lbs.
Johnson grass hay	6. lbs.

This gave each colt a ration of 6 lbs. grain and 1.1 lbs. hay per cwt. live weight, and the daily gain was only .56 lbs. per colt, the cost to winter being \$10.80 per colt.

LOT 3, EXPERIMENT 2.

Five colts were fed 150 days on a daily ration per colt of:

Ear corn	2 lbs.
Oats	2 lbs.
Peavine hay	6 lbs.

This gave a ration of .8 lbs. grain and 1.2 lbs. hay per cwt. live weight, and the gain per colt was .67 lbs. per day. The cost to winter was \$13.59 per colt.

LOT 3, EXPERIMENT 3.

Nine colts were fed 150 days on a daily ration per colt of:

Corn and cob meal	2 lbs.
Oats	2 lbs.
Bran	1 lb.
Cottonseed meal	1 lb.
Johnson grass hay	5 lbs.

This gave a daily ration per colt of 1.2 lbs. grain and 1 lb. hay per cwt. live weight, and the daily gain was 1 lb. per colt, which is a fairly good gain for a weanling colt. The cost to winter was \$16.50 per colt.

Silage can be fed successfully to the weanling colt provided it is sweet, clean, and free from mold. Cottonseed meal has been used in most rations because it furnishes a cheap and easily available source of protein which becomes so necessary to the growing colt when a roughage like Johnson grass hay is fed. It has been noticed, however, that a ration containing cottonseed meal is not as palatable as one in which the cottonseed meal has been displaced with wheat bran, and further that the colts on the bran ration will take more feed and make larger growth than those getting cottonseed meal.

LOT 4, EXPERIMENT 3.

Six colts were fed 150 days on a daily ration per colt of:

Cottonseed meal	1 lb.
Corn and cob meal	3 lbs.
Oats	3 lbs.
Silage	10 lbs.
Johnson grass hay	3 lbs.

The average weight of these colts November 1st was 540.8 lbs., and on April 1st, 703 lbs., making an average gain per mule of 137 lbs., or a daily gain of 1.14 lbs. per colt. This gave a daily ration equivalent to 1.25 lbs. grain and 1.33 lbs. hay per cwt. live weight. The cost of wintering each colt was \$18.35.

LOT 5, EXPERIMENT 3.

Six colts were fed 150 days on a daily ration per colt of:

Bran	2 lbs.
Corn and cob meal	3 lbs.
Oats	3 lbs.
Silage	10 lbs.
Johnson grass hay	3 lbs.

The average weight of these colts November 1st was 532.6 lbs. per colt, and on April 1st was 716.4 lbs., showing a gain of 183.8 lbs. per mule, or a daily gain of 1.22 lbs. per mule. This ration gave each colt the equivalent of 1.5 lbs. grain and 1.5 lbs. hay per cwt. live weight. The cost to winter each colt was \$19.80.

THE YEARLING MULE

The colts are turned out about April 1st and are run on good pasture until November 1st. They are then taken up and fed a good growing ration until pasture time again, it being just as necessary to keep the yearling colt growing as it is the weanling.

LOT 5, EXPERIMENT 1.

Two rather small yearling colts were fed 150 days on a daily ration per mule of:

Ear corn	5 lbs.
Johnson grass hay	5 lbs.

The average gain per colt was only 25 lbs., or .17 lbs. per day, and the cost to winter was \$12.00 per mule.

LOT 4, EXPERIMENT 2.

Six yearling mules were fed 150 days on a daily ration per mule of:

Ear corn	3.33 lbs.
Peanut cake	3 lbs.
Johnson grass hay	5 lbs.

These colts made an average daily gain per colt of .58 lbs. The cost to winter was \$14.40 per colt.

LOT 6, EXPERIMENT 3.

Nine yearling colts were fed 150 days on a daily ration per colt of:

Corn and cob meal	6 lbs.
Molasses	2 lbs.
Cottonseed meal	1.75 lbs.
Johnson grass hay	8 lbs.

These colts made an average daily gain of .8 lbs. per colt, and the cost to winter each colt was \$23.19. This gave to each colt a daily ration of 1.33 lbs. of grain and 1.1 lbs. of hay per cwt. live weight.

THE TWO YEAR OLD MULE

At pasture time, April 1, the colt is again turned to pasture until December 1, when he is put to work or wintered again on a ration sufficient to keep him in good condition until put to work in the spring as a three-year-old.

LOT 6, EXPERIMENT 1.

Ten two and three year old mules were fed 120 days on a daily ration per mule of:

Corn and cob meal	2 lbs.
Cottonseed meal	2 lbs.
Johnson grass hay	10 lbs.

This was found to be just a maintenance ration for mules averaging 765 lbs. in weight. The above ration gave each mule .52 of a pound of grain and 1.3 pounds of hay per cwt. live weight. The cost to winter each mule 120 days was \$12.33.

LOT 5, EXPERIMENT 2.

Eleven two-year old mules were fed 120 days on a daily ration per mule of:

Corn and cob meal.....	4 lbs.
Cottonseed meal	2 lbs.
Silage	10 lbs.
Oat straw	8 lbs.

The gain per mule was .45 lbs. per day, and the cost to winter (120 days) was \$13.20 per mule. The mules averaged 814 lbs. in weight, and received the equivalent of .73 lbs. of grain and 1.6 lbs. of hay per cwt. live weight.

LOT 7, EXPERIMENT 3.

Nine two-year-old mules were fed 120 days on a daily ration per mule of:

Corn and cob meal	6 lbs.
Cottonseed meal	2 lbs.
Corn silage	10 lbs.
Johnson grass hay	6 lbs.

These mules made an average daily gain of .72 lbs. each and received the equivalent of 1 lb. of grain and 1.37 lbs. of hay per cwt. of live weight. The cost to winter (120 days) was \$17.20 per mule.

PASTURE

The average pasture land throughout the State rents for about \$1.00 per acre, and of such land two acres will pasture a mare and colt during the pasture season. Two acres are also allowed for each mule one year old or over during pasture time.

SUMMARY

The results given have been grouped under three separate experiments: Experiment 1, Experiment 2, and Experiment 3. Three distinct classes of mules have been produced.

EXPERIMENT 1.

The class of mule produced under Experiment 1 is typical of the small, light mule standing $14\frac{1}{2}$ hands high and weighing 800 pounds. This class of mule is represented in great number throughout the South, especially in the upland or hilly sections. The results of Experiment 1 show the cost of producing such a mule under conditions similar to those of Mississippi to be:

To wintering mare (average)	\$16.34
To pasturing mare and foal.....	2.00
To wintering weanling colt (average).....	9.65
To pasturing yearling	2.00
To wintering yearling (average)	12.00
To pasturing 2 year old	2.00
To wintering 2 year old (average).....	12.33
To jack fee	10.00

Total

\$66.32

Such a mule if bought on the open market will cost \$125.00.



Experiment 1. Lighter type of "cotton mule" standing $14\frac{1}{2}$ hands high and weighing 800 pounds. This mule ordinarily sells for \$125.00. The average cost of raising such a mule to a three year old under Mississippi conditions is \$66.32.

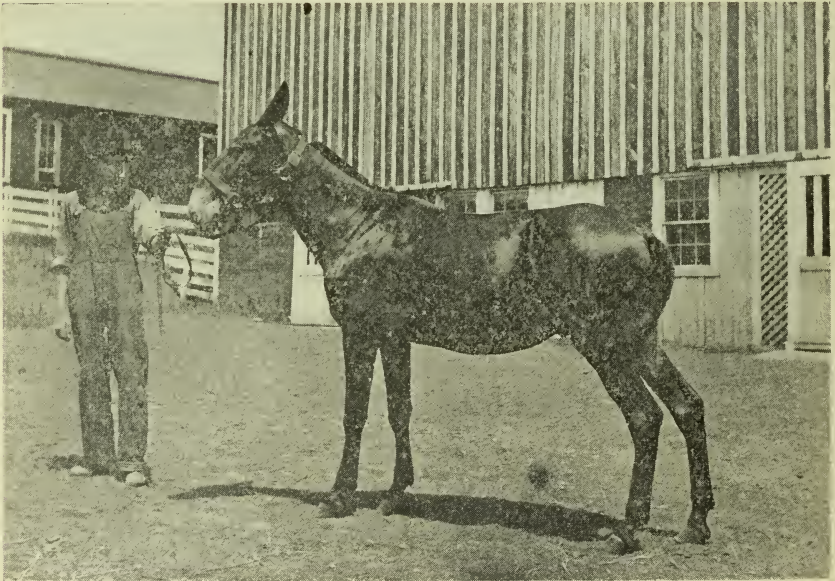
EXPERIMENT 2.

The type of mule produced under Experiment 2 is commonly known as the "cotton mule." This mule stands $15\frac{1}{2}$ to $15\frac{3}{4}$ hands high and weighs around 1100 pounds.

The results of Experiment 2 show the cost of producing the "cotton mule" under Mississippi conditions to be:

To wintering mare (average).....	\$17.10
To pasturing mare and foal	2.00
To wintering weanling colt (average).....	13.59
To pasturing yearling	2.00
To wintering yearling (average).....	14.40
To pasturing 2 year old	2.00
To wintering 2 year old (average).....	13.20
To jack fee	10.00
<hr/>	
Total	\$74.29

Such a mule if bought on the open market would cost between \$140.00 and \$160.00.



Experiment 2. Typical "cotton mule," weighing 1100 pounds and standing $15\frac{1}{2}$ hands high. This mule ordinarily sells for between \$140.00 and \$160.00. The average cost of producing this mule at the Mississippi Experiment Station has been \$76.29.

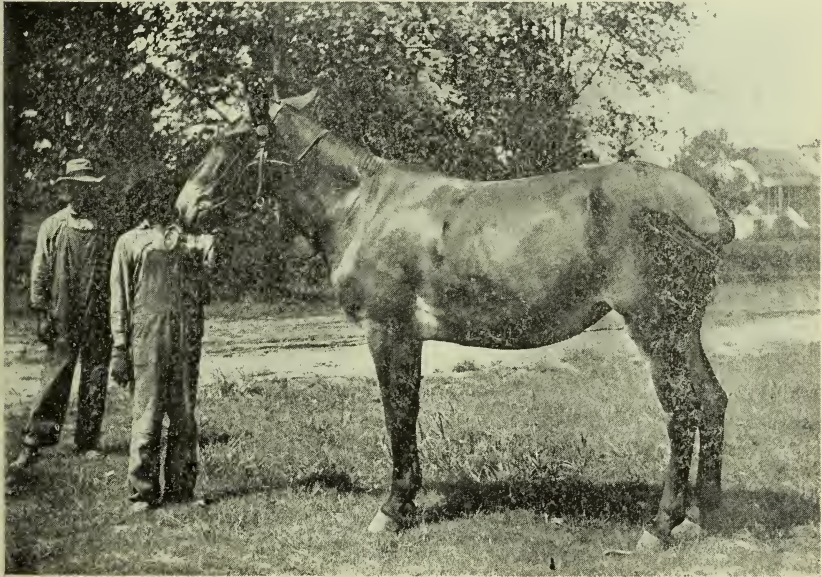
EXPERIMENT 3.

The type of mule produced under Experiment 3 is better adapted to average farm work where modern farm machinery is in use, demanding a mule of draft ability but at the same time a mule with life and stamina. Mules of this class would average 16 hands in height and 1200 pounds to 1250 pounds in weight.

The results of Experiment 3 show the cost of producing a good general purpose farm mule to be :

To wintering mare (average)	\$21.82
To pasturing mare and foal	2.00
To wintering weanling colt (average)	18.21
To pasturing yearling	2.00
To wintering yearling (average)	23.19
To pasturing 2 year old	2.00
To wintering 2 year old (average)	17.20
To jack fee.....	10.90
<hr/>	
Total	\$96.42

Such a mule if bought on the open market would cost between \$180.00 and \$225.00.



Experiment 3. A 16 hand 1250 pound farm work mule ordinarily selling for around \$200.00 on the open market. The average cost of raising this class of mule at the Mississippi Experiment Station has been \$96.42.

NET PROFIT OF MULE PRODUCTION
INTEREST ON ALL MONEY INVESTED AND DEPRECIATION
OF MARE CONSIDERED

The maintenance of the brood mare during those years she does not bring a colt is not considered. During such periods she takes the place of a mule at work until she begins to show heavy with foal.

No account has been taken in the preceding tables of the interest on the money invested nor the depreciation in the value of the brood mare. Under average farm conditions the mare is worked enough during the year to easily offset this item. Where the mare does no work at all during each year she raises a colt, however, the interest on all money invested and depreciation of the original investment must be included in the cost of production of each mule.

EXPERIMENT 1.

Small native mares of the type used in producing the light class of mule can be bought for about \$100.00 each.

COST OF PRODUCING MULE

To average cost of wintering mare, including interest @ 8% for 3 years and 4 months	\$20.68
To pasturing mare and foal, including interest @ 8% for 3 yrs	2.48
To average cost of wintering weanling colt, including interest @ 8% for 2 years and 5 months.....	11.52
To pasturing yearling, including interest @ 8% for 2 years.....	2.32
To average cost of wintering yearling, including interest @ 8% for 1 year and 5 months	13.36
To pasturing 2 year old, including interest @ 8% for 1 year.....	2.16
To average cost of wintering 2 year old, including interest @ 8% for 4 months	12.66
To jack fee, including interest @ 8% for 4 years.....	13.20
To 8% interest on money invested in a \$100.00 mare for 1 year	8.00
To 10% depreciation of value of mare yearly	10.00
Total	96.38
Value of mule on open market	125.00
Net profit per mule	28.62

EXPERIMENT 2.

The average mare used in the production of the "cotton mule" is a mare weighing about 1100 pounds and selling for about \$150.00.

COST OF PRODUCING MULE

To average cost of wintering mare, including interest @ 8% for 3 years and 4 months	\$21.66
To pasturing mare and foal, including interest @ 8% for 3 years	2.48
To average cost of wintering weanling colt, including interest @ 8% for 2 years and 5 months.....	16.22
To pasturing yearling, including interest @ 8% for 2 years.....	2.32
To average cost of wintering yearling, including interest @ 8% for 1 year and 5 months	16.03

To pasturing 2 year old, including interest @ 8% for 1 year.....	2.16
To average cost of wintering 2 year old, including interest @ 8% for 4 months	13.55
To jack fee, including interest @ 8% for 4 years.....	13.20
To 8% interest on \$150.00 invested in mare for 1 year.....	12.00
To 10% depreciation of value of mare yearly.....	15.00
Total	114.62
Value of mule on open market	150.00
Net profit per mule	35.38

EXPERIMENT 3.

The average mare used in the production of the better class farm work mule is a 1200 or 1300 pound mare selling for about \$175.00.

COST OF PRODUCING MULE

To average cost of wintering mare, including interest @ 8% for 3 years and 4 months	\$27.63
To pasturing mare and foal, including interest @ 8% for 3 years	2.48
To average cost of wintering weanling colt, including interest @ 8% for 2 years and 5 months.....	21.74
To pasturing yearling, including interest @ 8% for 2 years.....	2.32
To average cost of wintering yearling, including interest @ 8% for 1 year and 5 months	25.83
To pasturing 2 year old, including interest @ 8% for 1 year.....	2.16
To average cost of wintering 2 year old, including interest @ 8% for 4 months	17.66
To jack fee including interest @ 8% for 4 years.....	13.20
To 8% interest on \$175.00 invested in mare for 1 year.....	14.00
To 10% depreciation of mare yearly.....	17.50
Total	144.52
Value of mule on open market	200.00
Net profit per mule	55.48

CONCLUSION

Charging interest on all money invested @ 8% and 10% depreciation in the value of the brood mare yearly, and valuing all feeds used at their average market value, mules are still produced at a good profit; the small mule at a profit of \$28.62 per head, the "cotton mule" at a profit of \$35.38 per head, and the heavy work mule at a profit of \$55.48 per head.

The farmer who can give the brood mare enough work to pay for her keep and depreciation can raise mules in the South for less than one-half their cost on the open market.

Where the cost of keeping the mare must be included but no account taken of the interest on the money invested or her depreciation in value, the small type mule can be produced in the South for two-thirds his market value, the "cotton mule" for slightly over one-half his market value, and the better grade farm mule for less than one-half his market value.

AVAILABLE BULLETINS AND CIRCULARS

The following bulletins and circulars of the Station may be had upon request:

BULLETINS

- 139—Boll Weevil in Mississippi, 1909.
- 140—Cotton Diseases in Mississippi.
- 141—Control of Diseases of Fruits, Vegetables and Flowers.
- 145—Inspection and Analyses of Commercial Feeding Stuffs.
- 146—Suggestions for Growing Home Fruits.
- 147—Apple Growing in Mississippi.
- 148—Inspection and Analyses of Cottonseed Meal.
- 149—Inspection and Analyses of Commercial Feeding Stuffs.
- 150—Inspection and Analyses of Commercial Fertilizer.
- 151—Inspection and Analyses of Cottonseed Meal.
- 152—Inspection and Analyses of Commercial Feeding Stuffs.
- 153—Inspection and Analyses of Commercial Feeding Stuffs.
- 154—Inspection and Analyses of Commercial Feeding Stuffs.
- 155—Recent Cotton Experiments.
- 156—Inspection and Analyses of Cottonseed Meal.
- 159—Clearing Pine Lands.
- 160—The Cut-Over Lands of South Mississippi.
- 161—Cotton Experiments, 1912.
- 162—Cottonseed Meal as a Feed for Laying Hens.
- 163—Truck Crops for South Mississippi.
- 164—Cotton Experiments, 1913.
- 165—Report of the Work Done at Holly Springs Branch Experiment Station, 1913.
- 166—Dairying on Cut-over Pine Lands.
- 167—Corn Silage Compared with Hulls for Fattening Steers.
- 168—Bacteriological Effects of Green Manures.
- 169—Cotton Experiments, 1914.
- 170—Corn.
- 172—Forage Crops.
- 173—Cotton Experiments, 1915.
- Technical Bulletin No. 2—Some Scale Insects of Mississippi.
- Technical Bulletin No. 3—Form and Structure of Certain Plant Hybrids in Comparison with the Form and Structure of their Parents.
- Technical Bulletin No. 4—The Soils of Mississippi.
- Technical Bulletin No. 5—Sero-Diagnosis of Pregnancy in Mares.
- Technical Bulletin No. 6—Forage Poisoning Due to *Claviceps Paspali* on *Paspalum*.

CIRCULARS

- Underground Waters of Mississippi.
- Report of Work on Alfalfa at Holly Springs Branch Experiment Station.
- Diseases Prevalent Among Horses and Cattle in Mississippi.
- Mississippi Poultry House.
- Express Cotton.