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Mule Production



FARMERS' BULLETIN NO. 1341

U. S. DEPARTMENT OF AGRICULTURE

THE ABILITY of the mule to endure hardship and perform sterling service under adverse conditions has established him as a real asset in American agriculture.

The mule will give best service under favorable conditions of feeding and management.

Good, sound mares should be selected for breeding in order to be successful in producing high-grade mules. A very desirable "mule mare" is one having about one-fourth draft blood and three-fourths light-horse blood.

The most practical feeds to use for mules are those which are grown on the farm or plantation so far as they provide the essential nutrients for a balanced ration.

The general form and appearance of the mule should resemble closely that of a horse, and in judging mules the same general points of perfection should be looked for.

Mules range in height from 12 hands to 17½ hands and in weight from 600 pounds to 1,600 pounds.

While the mule is essentially a draft animal, it is used widely for utility purposes, especially in the South. A smart, alert mule, with a long, free stride at the walk and a snappy, balanced trot is highly desired.

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MULE PRODUCTION

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DISTRIBUTION OF MULES IN THE UNITED STATES

THE popularity and importance of the mule as a work animal in the United States are attested by its extensive use in farming and similar occupations for a period of many years. According to United States Census figures, the number of mules on farms, plantations, and ranches in this country in 1910 was 4,101,000. The number on January 1, 1920, had increased to 5,432,000; in 1930 it totaled 5,354,000; and in 1940 it was 3,845,000. The United States Department of Agriculture has estimated that of the total of 2,544,000 mules on farms, plantations, and ranches of the United States on January 1, 1948, 2,110,000, or approximately 83 percent, were in 10 Southern and Southeastern States, which in numbers rank as follows:

Mississippi.....	306,000
North Carolina.....	269,000
Georgia.....	257,000
Tennessee.....	234,000
Alabama.....	222,000
Texas.....	191,000
Kentucky.....	171,000
Arkansas.....	165,000
South Carolina.....	159,000
Louisiana.....	136,000
Total.....	2,110,000

¹ Resigned August 11, 1945.

The only other State having more than 100,000 head of mules on its farms, ranches, or plantations in 1948 was Missouri, with 105,000. That mules are far more prevalent than horses in most of the above-named States is indicated by the fact that, on January 1, 1948, these States had an estimated total of 1,390,000 horses, compared with the 2,110,000 mules, and 440,000 of these horses were in Texas alone.

ADVANTAGES OF THE MULE AS A WORK ANIMAL

The mule is a hardy work animal. While this humble creature responds to good treatment and gives best service under favorable conditions of feeding and management, it is his ability to endure hardship and to perform sterling service under adverse conditions that has established him so firmly in American agriculture. Those who are staunch supporters of the mule say that, in comparison with the horse he will live longer, endure more work and hardship, require less attention and feed, is less liable to digestive disorders, lameness, and disease, is more easily handled in large numbers, is less irritable, and is more capable of performing work in the hands of a mediocre or poor horseman. Whether or not all these claims may be substantiated, it is a fact that the mule is well established as a work animal in those sections where climatic conditions are severe, suitable feed often lacking, and horsemanship not a prevailing art (fig. 1).

SOME PECULIARITIES OF THE MULE

The mule is an animal with possibly more eccentricities and undeniable virtues than any other domestic animal. One might suspect from his mixed heritage a rather unusual temperament requiring careful treatment, which is the case. The chief difficulty is to know just how to handle the mule in order to bring the desirable qualities of his maternal ancestry into the foreground and to keep subservient the undesirable donkey characteristics. To treat consistently an animal having a combination of many good and bad qualities is a task which may tax the ability of even the best horseman. Yet the virtues of the mule have been so evident both in times of peace and in times of war that many ardent horse lovers who were once prejudiced against him have come to admire the animal which has no "pride of ancestry or hope of posterity" (fig. 2).

There are some peculiarities which belong to the mule alone. He does not like to be hurried, worried, or cuffed about; forcing him to do things against his will is practically impossible and only makes matters worse. The mule must be understood and gently but firmly persuaded to do things that are out of the ordinary. He is naturally suspicious of everybody who comes around him, and seems to have an uncanny way of detecting whether a person is going to treat him harshly or kindly. His reception is usually in like manner, nor does he forget the person who inflicts harsh treatment.

There is a wrong and a right way to lead a mule. A man who looks at a mule and lugs at his head will never make any progress. The mule will not be pulled. He will usually follow quietly, however, if a man walks away in the direction he desires to go. Neither can you

“bully” mules into going through tight places; they are somewhat like sheep, and if the leader can be induced to go the rest will follow.

Next to satisfying a hearty appetite, the height of mule joy is to roll. A mule will roll at every opportunity and often at inopportune times, when he makes the opportunity suit his own convenience. He dislikes mud and water holes in the road, does not work well on soft, muddy ground, and is what is known as a sure-footed animal.



Figure 1.—A pair of farm mules.

PRODUCTION OF MULES

The mule is a hybrid animal having a jackass, commonly called a jack, for a sire and a mare for a dam. When the reverse cross is made and the female ass (or jennet) is bred to a stallion, the offspring is called a “hinny.” In practically all instances, the mule is an infertile animal and is incapable of reproduction. This is true particularly in the case of the male mule, and no occurrences have been reported in which the service of such an animal has produced young. Lack of fertility in the male mule is attributed to various factors, such as cryptorchidism, absence of spermatocytes and spermatozoa, and inability of the chromosomes to function properly in the essential pairing process. Fertility in mare mules is quite rare but it does occur occasionally. Three apparently authentic instances of this kind that have been reported within somewhat recent years are as follows:

At the Texas Agricultural and Mechanical College, College Station, Tex., an aged mare mule had a female foal in June 1920 as a result of service to a jack. In September 1923 the same mare mule had a male foal sired by a stallion. The female foal never produced progeny, but the male foal was later used in breeding work and sired some colts.

At Hartsville, Ind., on the farm of W. H. Mobley, a mare mule was reported to have foaled a male colt in May 1938. This colt was sired by a Percheron stallion and was quite horselike in practically all of its body characteristics.

At St. Martinville, La., in 1948, a 21-year-old mare mule is credited with the production of a male foal. The picture of this offspring indicates it was sired by a stallion.

SELECTING THE JACK

The importation of jacks, and consequently the production of mules in the United States, dates back to colonial times. About 1787 George Washington was presented with a jack by the King of Spain, which was used in the stud at Mount Vernon. Many good mules were produced in those days, and the value of the mule as a work animal



Figure 2.—Prior to World War II, many mules found their way into the United States Army. Good, sound mules with quality were required. This illustration shows representative types of “lead” and “wheel” mules in Army service.

was soon recognized by intelligent planters. It is only within the last 60 years, however, that the production of mules has become an extensive enterprise and that much attention has been given to the rearing and selection of the best jack stock.

The American jack of today is a composite of the bloods of some of the best foreign breeds, and in attaining the highest standard of excellence prevailing in the jack stock of the United States, the breeders have emphasized the valuable utility points so much desired in the best jacks, such as size, weight, bone, style, quality, and action. In the United States, jacks are usually spoken of as “jennet jacks” and “mule jacks.” As these terms imply, jennet jacks are used for mating with jennets for the reproduction of the breed, and mule jacks are used for mating with mares for the production of mules. As commonly found, the jennet jack is a larger animal than the mule jack and is of superior conformation and quality.

A good mule jack (fig. 3) should be not less than 15 hands² high and possess plenty of weight, large bone with quality, style, and action.

² A hand is a measurement of height equal to 4 inches.

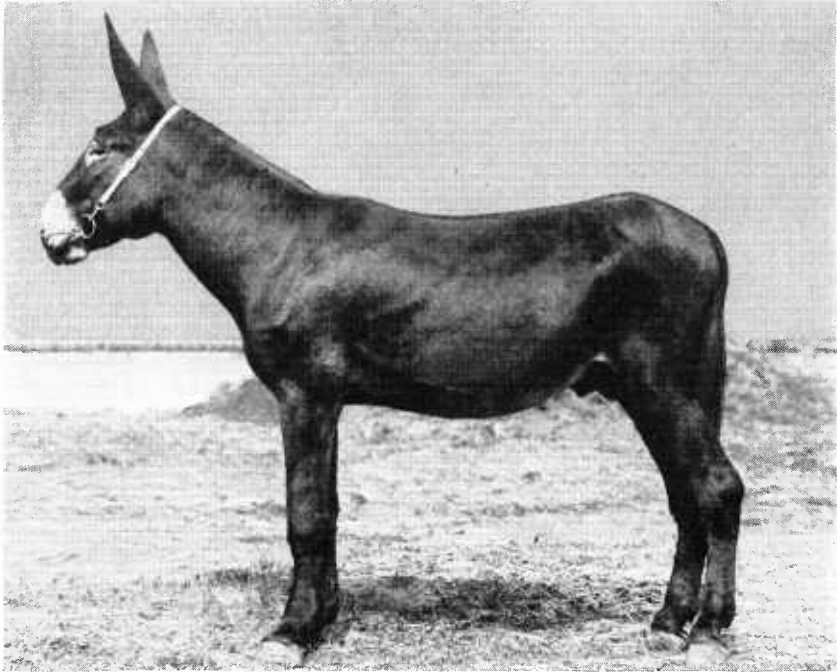


Figure 3.—A prize-winning jack. Note size of bone and general quality throughout.

The most essential points of conformation in a good jack are: A straight strong back, closely coupled and well-muscled over the loin; a long, level rump; and a deep body with well-sprung ribs to allow ample room for lung development. Vigor and strength of constitution are indicated by a broad chest and large heart girth.

The legs should be set straight, be well-muscled, and have plenty of bone. The length of leg should be in proportion to the depth of the body; height obtained principally by length of leg is undesirable. The size of the bone is very important. It is usually determined by measuring the circumference of the cannon bone about half way between the knee and the fetlock joint. This should be about 8½ inches in a jack of 15 hands' height. It is also very desirable to have large, well-shaped feet and good, sound hocks. The head should be well-proportioned, with the profile of the nose straight or slightly Roman. The ears should be long, well-set, and alert on a mature animal and should measure, horizontally, 33 inches or more in length from tip to tip.

*Measurements of a good jack*³

[Weight 1,200 pounds; height (standard measure), 15 hands, 3 inches]

<i>Inches</i>		<i>Inches</i>	
Ears from tip to tip.....	34	Around body at girth.....	70
Around face and jaw.....	39	Around body at loin.....	67
Around neck at throatlatch.....	36	Around hoof, below coronet (next	
Around arm.....	21	to hair).....	16½
Around cannon.....	8½	Above hock.....	17½
Length from poll to tail.....	84	Below hock.....	9½

³Twice champion at the Missouri State Fair and reserve champion at the World's Fair, San Francisco.

Some of the common defects in jacks which should be avoided are: Flat, narrow chest, which indicates a weak constitution and lack of vigor; light-muscled loin and long coupling; short, drooping rump; excessive length of leg; light bone; poor hocks, with a tendency toward curbiness; small feet with contracted heels; and short or droopy ears.

CARE OF THE JACK

The proper care and management of the jack are somewhat exacting, as he is rather peculiar in his likes and dislikes. While a stallion may be spoiled because of his nervous temperament, the jack may be just as quickly ruined because of his inclination to be sluggish. The jack should have a caretaker who understands jack management thoroughly. This is very important, as the disposition of the jack is partly controlled by the groom. The jack should be quietly but firmly handled. A bad disposition in a jack is usually attributable to harsh handling or mismanagement of the animal when young. Through continuous observation the groom should learn the peculiar individuality of the jack and the little things required for his proper management.

Abundant exercise is one of the big factors in the management of a breeding animal. A roomy, well-ventilated, and well-lighted box stall opening to an exercising paddock is necessary for the proper care of the jack. It is important that the exercising paddock be of good size. Moreover, in order to insure plenty of exercise, it is well to give the jack some road work.

A young jack intended for siring mules should not be permitted to run with jennets or mules, as this practice usually leads to difficulty in teaching him to serve mares, when used in the stud. Instead the young jack should have fillies or gentle mares for companions. The jack may begin serving mares at the age of 2 or 2½ years. At this early age he should be bred to only a few mares. When he is 3 years old he may serve 25 or 30 mares, but he should not be allowed more than one mating a day. A mature jack may serve as many as two mares in a single day provided the two services are several hours apart. The number of mares a jack should serve during a season depends on the strength and vigor of the individual, but 70 or 80 mares probably is the maximum number that he can serve with satisfactory results. Artificial breeding may be employed if the jack is patronized very heavily. This not only conserves the vitality of the jack but also enables the owner to breed a much larger number of mares. If care and precaution are taken, artificial breeding may be practiced with as much success as breeding in the natural way. In fact, some mares which do not conceive from natural service are successfully impregnated artificially. It is sometimes advisable to use a stallion for teasing purposes in order to conserve the jack when the patronage is heavy.

FEEDS FOR THE JACK

The jack is a rather sluggish animal, and for this reason his feeds should be slightly laxative in character. Wheat bran, oats, crushed barley, and linseed meal are splendid grain feeds to use. Sheaf oats and green feeds are also very satisfactory. Corn should be used only in limited quantities and preferably during winter months. Many jack

breeders obtain good results by feeding a ration of sheaf oats, clover, and alfalfa hay. In summer a good-sized grass paddock is very helpful, both as a source of feed and for conditioning purposes.

THE BROOD MARE

Only sound brood mares of good quality should be selected in producing high-grade mules. Breeders of work horses usually take particular care in choosing good mares for breeding purposes, but ordinarily no consistent effort is made by mule breeders in selecting mares for the production of mules. The idea seems to prevail that a mare which is not suitable for breeding to a stallion is good enough to produce a mule. This is a mistake, for no matter how good the jack may be, it is inconsistent to expect uniformly good mule foals from inferior mares. The same care should be applied in selecting mule mares as is exercised in selecting brood mares to raise horse colts.

The mares used in mule production are generally of no fixed type or breed and vary from large, heavy draft mares to smaller mares of the light-horse type (figs. 4 and 5). As the mule is a work animal which cannot reproduce its kind, except in rare instances, it is not essential that mares used for producing them be of any fixed breeding.

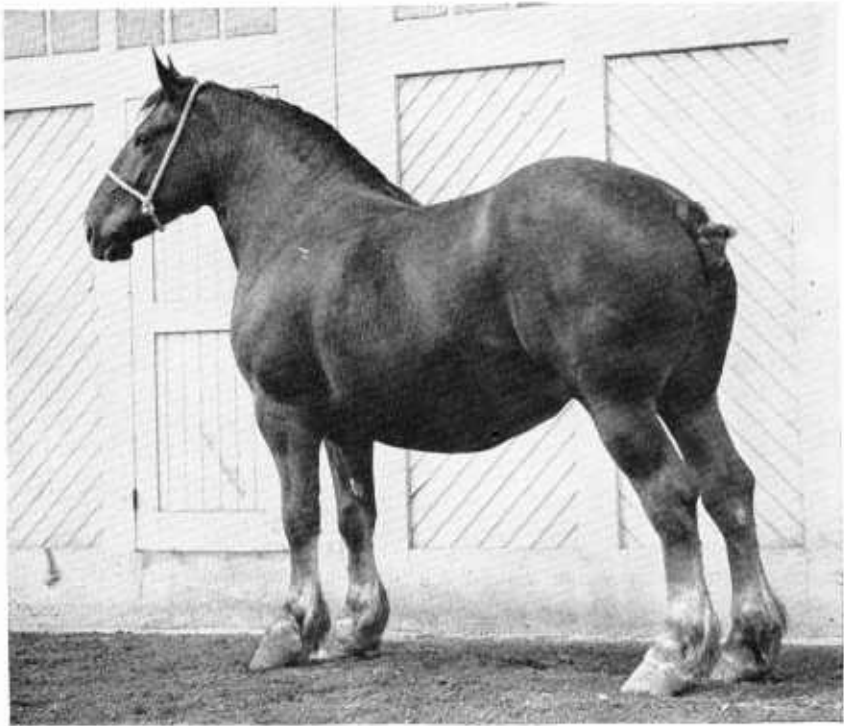


Figure 4.—A desirable type of brood mare for producing draft mules. Note the "breediness," substance, and conformation of this mare.



Figure 5.—A desirable type of light "mule mare" for producing mules of quality. Note roominess of body, short back, depth of heart girth, and "breediness" of this mare.

It is very necessary, however, that the mares be of the correct size and type. Mules foaled from mares of the draft type are large and heavy and are excellent for draft purposes, but they are more sluggish in temperament and cannot stand the heat so well as mules produced from mares having light-horse blood in their veins. Mules produced from mares of the light-horse type, on the other hand, are usually too small to be of greatest value because their dams were not large enough. Because of these facts, experienced breeders state that a very desirable mule mare is one having about one-fourth draft blood and three-fourths light-horse blood. A mare of this breeding will weigh between 1,100 and 1,500 pounds and will produce good-sized mules, with style, action, and stamina.

In conformation the mule mare should possess all the good qualities desired in the brood mare used for producing good work horses. Some of the most important points of the good mule mare are: A broad chest and large heart girth, indicating a vigorous constitution; a roomy barrel to allow for full development of the fetus; a straight back, strongly muscled over the loins; well-set legs with broad, flat, sound bone of good quality; large, well-shaped feet; and feminine character, indicating "breediness." To sum up, the mare should combine size with quality, type, soundness, and breediness. The last term includes a variety of characteristics which makes the mare a good mother.

BREEDING THE MARE

The mare will come in heat, on an average, every 18 to 21 days and will remain in heat from 2 to 4 days, though exceptional mares vary in this respect and remain in heat only a few hours. The mare usually comes in heat on the ninth day after the foal is dropped. In order to avoid accidents at breeding time, hobbles should always be put on the mare. Conception is more likely to take place if the mare is rested for a few hours at time of service. The mare should be returned to the jack in from 18 to 21 days after service, in order to make sure that conception has taken place.

TABLE 1.—*Calendar showing time of service and date of foaling based on 340-day gestation period for mares*

Day of month mare is bred	Date of foaling												
	Bred in Jan.	Bred in Feb.	Bred in Mar.	Bred in Apr.	Bred in May	Bred in June	Bred in July	Bred in Aug.	Bred in Sept.	Bred in Oct.	Bred in Nov.	Bred in Dec.	
	<i>Dec.</i>	<i>Jan.</i>	<i>Feb.</i>	<i>Mar.</i>	<i>Apr.</i>	<i>May</i>	<i>June</i>	<i>July</i>	<i>Aug.</i>	<i>Sept.</i>	<i>Oct.</i>	<i>Nov.</i>	
1	6	6	3	6	5	6	5	6	6	5	6	5	
2	7	7	4	7	6	7	6	7	7	6	7	6	
3	8	8	5	8	7	8	7	8	8	7	8	7	
4	9	9	6	9	8	9	8	9	9	8	9	8	
5	10	10	7	10	9	10	9	10	10	9	10	9	
6	11	11	8	11	10	11	10	11	11	10	11	10	
7	12	12	9	12	11	12	11	12	12	11	12	11	
8	13	13	10	13	12	13	12	13	13	12	13	12	
9	14	14	11	14	13	14	13	14	14	13	14	13	
10	15	15	12	15	14	15	14	15	15	14	15	14	
11	16	16	13	16	15	16	15	16	16	15	16	15	
12	17	17	14	17	16	17	16	17	17	16	17	16	
13	18	18	15	18	17	18	17	18	18	17	18	17	
14	19	19	16	19	18	19	18	19	19	18	19	18	
15	20	20	17	20	19	20	19	20	20	19	20	19	
16	21	21	18	21	20	21	20	21	21	20	21	20	
17	22	22	19	22	21	22	21	22	22	21	22	21	
18	23	23	20	23	22	23	22	23	23	22	23	22	
19	24	24	21	24	23	24	23	24	24	23	24	23	
20	25	25	22	25	24	25	24	25	25	24	25	24	
21	26	26	23	26	25	26	25	26	26	25	26	25	
22	27	27	24	27	26	27	26	27	27	26	27	26	
23	28	28	25	28	27	28	27	28	28	27	28	27	
24	29	29	26	29	28	29	28	29	29	28	29	28	
25	30	30	27	30	29	30	29	30	30	29	30	29	
26	31	31	28	31	30	31	30	31	31	30	31	30	
	<i>Jan.</i>	<i>Feb.</i>	<i>Mar.</i>	<i>Apr.</i>	<i>May</i>	<i>June</i>	<i>July</i>	<i>Aug.</i>	<i>Sept.</i>	<i>Oct.</i>	<i>Nov.</i>	<i>Dec.</i>	
27	1	1	1	1	1	1	1	1	1	1	1	1	
28	2	2	2	2	2	2	2	2	2	2	2	2	
29	3		3	3	3	3	3	3	3	3	3	3	
30	4		4	4	4	4	4	4	4	4	4	4	
31	5		5		5		5	5		5		5	

CARE OF THE PREGNANT MARE

There should be no sudden changes in feed or work of the mare after she becomes pregnant. She should be given a well-balanced ration

of feed that will supply the needs of her own body as well as those of the growing fetus. Feeds that are too fattening should be avoided, also spoiled feeds such as moldy or damaged hay, as there is danger that they may cause abortion. Exercise is a most important essential to the health of the pregnant mare, as well as for the development of a strong, healthy foal. The best and most economical way of giving this exercise is by using the mare in regular farm work. The pregnant brood mare should not be subjected to hard pulls or severe strains, however, and the severity of the work should be regulated to fit the stage of pregnancy. It is advisable to lighten the work generally as pregnancy advances. If proper care and judgment are used, the mare may safely be worked up to within a week or 10 days of foaling. The average gestation period of mares—that is, the length of time that they carry their foals—is about 340 days. This period varies slightly with individual mares. It is important that a careful record be kept of the date of service to the jack in order that the time of foaling may be anticipated (table 1). A very sure sign that the foal will be dropped in a short while is the appearance of wax on the teats, which usually occurs 2 or 3 days before parturition.

CARE OF MARE AT FOALING TIME

About a week or 10 days before the foal is expected the mare should be turned into a pasture or grassy paddock, where there is no danger of injury from other animals. If the weather is mild, a paddock or pasture is a desirable place for the foal to be delivered, as there is usually less danger of infection there than in a stable. If desirable conditions for foaling outside cannot be obtained, a roomy box stall that has been well cleaned out, disinfected, and bedded with fresh straw should be provided.

It is well to observe the mare closely when the foal is expected, in order that assistance may be given in delivery if necessary. To do this it will be necessary for the attendant to be where he can see the mare and yet be unseen by her. Should she need assistance, a veterinarian should be summoned at once. If it is essential that aid be given immediately, the service should be rendered by one who has had experience with and understands the many phases of difficult parturition. In normal presentation of the fetus, either the forelegs extended with the head resting on them or the hind legs extended will first make their appearance through the vulva.

If the foal has been delivered satisfactorily, the attendant should remove as soon as possible any tissue or material that may be clogging its nostrils and see that respiration is started. Assistance may be rendered in this respect by blowing into the foal's nostrils, working its ribs, and rubbing its sides with a cloth or wisp of straw. As soon as practicable, without disturbing the mare unnecessarily, remove the afterbirth from the proximity of the mare and, if foaling occurred in a stable, clean out the bedding that has been soiled during parturition, sprinkle lime on the floor where the bedding has been removed, and supply fresh bedding.

To prevent infection, the navel cord of the foal should be saturated with full-strength tincture of iodine and then dusted with powdered slaked lime. This should be repeated each day until the navel cord

drops off. A normal foal will usually find its own way to the mare's udder soon after arrival. If, however, the foal is weak and unable to stand within 2 or 3 hours after birth, it should be assisted in getting its first meal. It is very important that the newborn foal get the first milk from its dam, which is a substance called colostrum. In addition to having the food properties so much needed by the newborn, the colostrum also has a purgative effect, which stimulates the action of the digestive tract in eliminating the fecal matter already collected during the period of gestation. If this fecal matter is not eliminated within 24 hours after the foal is born, a dose of castor oil (2 to 4 tablespoons) shaken well in warm milk should be given and repeated in 3 or 4 hours until the desired results are obtained. It also may be advisable to inject either warm water or 2 ounces of castor oil into the bowels through the anus.

CARE OF MARE AND FOAL

The mare should receive only bran mashes and other light feeds such as oatmeal gruel until she has recovered from the effects of foaling and the feverish condition of her system has disappeared. The ration should then be increased gradually until the mare is again on full feed.

If the mare has been on pasture before parturition and when the weather is warm and pleasant, the mare and foal may be kept on pasture or paddock as soon as the foal is able to follow. The exercise they will get in this way is very beneficial, and they will thrive better in the open. If the mare was worked prior to foaling, she will probably be ready for work again in 10 days or 2 weeks after the foal is born. When this is done the foal should be confined in a stable or paddock and not permitted to follow the mare in the fields. The mare and foal will fret for each other for a while, but they will soon become accustomed to separation. When working, the mare should be returned to the stable once in the forenoon and in the midafternoon to allow the foal to suckle. The mare should be allowed to cool before being turned in with the foal, however, as there is danger of causing the foal to have scours and other digestive troubles if the mare is overheated when nursing.

When the mare is idle during the fly season, it is best to keep her and her foal in a darkened stable in the day and turn them out on pasture at night. The mare should be fed some grain and hay during the summer, because grass alone will not supply the needs of her body and also provide a sufficient milk flow for the foal.

The foal usually begins to eat a small quantity of grain at the age of 3 or 4 weeks. Oatmeal should be the first grain fed, and wheat bran may be added later. Best results in feeding grain to foals in the open are obtained by building a "creep" into which they may pass at all times and which will prevent the mares or other mature horses from reaching the feed provided for the foals. The foal will eat only a little grain at first, but it is worth much to have it begin eating a small quantity as soon as possible, because the more accustomed it becomes to eating grain while young, the less trouble there will be at weaning time. The mare may be induced to frequent the creep by giving her an occasional feed near there also.

WEANING THE FOAL

Under ordinary conditions the foal is usually weaned when about 6 months old, but if the mare is working or again in foal and the foal is thrifty it may be weaned earlier. When the foal has been taught to eat grain early, this separation from its dam need not cause any check in the foal's development. Weaning is a trying time in the life of a foal, however, and it should receive additional feed and care to make up for the loss of the mother's milk from its ration. When the foal is once taken away from the mare, the separation should be made complete.

The mare also requires some individual attention at weaning time. When separated from her foal, it will be necessary to milk her by hand several times daily for a few days to prevent too much milk from collecting in the udder and causing it to become caked and swollen. To assist in the drying-up process, the mare should be milked only partially dry; if the milk flow is maintained the grain ration should be reduced for a few days.

CARE OF THE FOAL AFTER WEANING

At no time in the foal's life is pasture more important than at the time of weaning. On being taken away from its dam, the foal needs succulent feed, and the best way of supplying this feed is by having a good pasture. Not only is a good pasture necessary for the development of the foal, but it is also necessary if the foal is to be raised in an economical manner. In addition to the pasture the foal should receive liberal quantities of grain and hay. A grain mixture which will be suitable for the young foal may be made of 4 parts oats, 1 part corn, and 1 part wheat bran. The hay should be either mixed hay of good quality or clean, well-cured legume hay. Half of the foal's growth is made during its first year, and it should have every advantage possible for maximum development. Foals like companionship and do better if several are allowed to run together (fig. 6).

THE ORPHAN FOAL

It may happen sometimes that the mare dies soon after foaling or fails to give milk enough for her foal. When either of these misfortunes occurs the foal must be raised by hand, which is a tedious undertaking but is worth while if done properly. As a feed for the orphan foal, the best and most practical substitute for mare's milk is cow's milk after it has been prepared to conform as nearly as possible in composition to the milk of the mare. This is done by selecting milk that is low in butterfat and diluting it one-half with fresh water. Add a tablespoon of sugar and 3 or 4 teaspoons of limewater to a pint of this diluted milk and heat to body temperature. Give the foal about a half teacup of this prepared milk at first and feed at short intervals. Gradually increase the quantity per feeding and the length of time between feeding periods as the foal develops. A bottle with a rubber nipple attached is the most convenient way to give milk to the orphan.

The utensils used in feeding the orphan foal should be kept scrupulously clean. This can be done by freely utilizing hot water and

sunshine, both of which are enemies to germs that collect and thrive in milk containers.

SPRING OR FALL FOALS

The climatic conditions and nature of the farm work determine largely whether it is best to have the foals come in the spring or in the fall.

The natural breeding season for mares is in the spring, which is the generally accepted time to have foals. There are, however, several advantages of having fall foals, especially in the South. First, the fall-born foal comes at a time when the mare can probably be more easily spared from farm work and at a time when flies are not so abundant. Another advantage is that the fall foal is weaned when it can be turned on to pasture, and its development is not retarded at this critical time. To raise fall foals successfully, where climatic conditions are unfavorable, it is essential that housing facilities be adequate to take care of the young stock during winter weather.

EDUCATING THE FOAL

The time to begin the education of the foal is early in its life. It should be halter-broken and taught to lead when a few weeks old. The more the foal is handled when young, the fewer will be the difficulties encountered later when it is desired to put him to work.

Mules reach maturity at the age of 5 years, but they may be given light work when 3 years old. Care should be taken, however, not to overload young mules. Overtaxing the young animal not only tends to check its development but also causes it to become unreliable as a



Figure 6.—Mule foals like companionship. A group of weanlings on pasture.

worker, and possibly balky. A young mule that becomes accustomed to moving a load every time it is called upon will develop into a reliable work animal.

FEEDING AND CARE OF MULES

Too little thought and attention are usually given to the proper methods of management and feeding of mules. Where the use of mules as work stock prevails, the feeding is sometimes done in a rather haphazard manner without regard to efficiency and economy. The essentials of a good caretaker are judgment and common sense, combined with a knowledge of feeds. Ordinarily the most practical feeds to use are those which are grown on the farm or plantation so far as they provide the essential nutrients for a balanced ration.⁴ Corn, oats, and barley are the most widely used grains, as there is hardly a section of the United States where one or more of them are not grown. These grains may be combined or taken singly and supplemented with such feeds as wheat bran, linseed meal, or cottonseed meal to help make a balanced ration.

With the concentrates there should be fed dry roughage of various kinds such as Johnson grass, timothy, clover, alfalfa, soybean, cowpea, and prairie hays. Some of these may be used alone, but others should be fed in combination for best results. The best roughage to feed depends principally upon the kind of grain used. Where oats are the main concentrate the roughage may be largely carbonaceous hays, such as Johnson grass, timothy, or prairie hay. If corn is the principal grain used, however, a good mixed hay will generally prove most satisfactory. It is rarely advisable to use a legume hay, such as alfalfa, as the sole roughage although such a feed may make up as much as two-thirds of the total roughage allowance when the grain fed is highly carbonaceous. The principles that are used in the correct feeding of horses may be applied to the feeding of mules. As a general rule $1\frac{1}{4}$ pounds of grain and $1\frac{1}{4}$ pounds of good hay daily per 100 pounds of live weight will be found to be about the right quantity of feed to use for an animal at medium work. For heavy work it will be necessary to increase the quantity of grain to $1\frac{1}{4}$ or $1\frac{1}{3}$ pounds, but no more roughage will be needed. In fact it is sometimes advisable to reduce the roughage allowance somewhat below the $1\frac{1}{4}$ -pound standard specified for medium work, when mules are worked hard. The exact quantity of feed in all instances depends upon the individual animal and must be determined by the feeder.

While there are numerous cases in which mules are underfed, there are many others in which the owner suffers financially because the mules are fed more high-priced feeds than they really need, through the use of large, improperly balanced rations. Overfeeding is most likely to be done during the winter months when the mules are idle. During this period, idle mules may be kept in good condition largely on hay, straw, corn stover, and a small quantity of grain. Mules that

⁴A balanced ration is one which will supply the protein, carbohydrate, and mineral elements in such proportion as to meet as nearly as possible the body requirements of the animal for doing the work which it is to perform. Methods of computing a balanced ration are fully explained in Farmers' Bulletin 1030, Feeding Horses, which may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 5 cents a copy.

are worked hard and are receiving heavy rations should have their grain feed allowance diminished approximately one-half when temporarily idle. Idle mules thrive better if they are not confined in stables but are kept in the open, preferably on pasture.

Digestive disorders are more prevalent among work stock during the spring and summer months than at any other time. This is because overheated animals are improperly fed and watered. If the mule appears to be excessively warm when brought in from work, it should be permitted to cool off before being watered or fed. Attention to such details will prevent many cases of colic. Mules sometimes suffer in hot weather from heat because they are allowed to eat too much grain or hay. This is most likely to occur when fresh, new hay is being fed. The hay ration should be fed mainly at night so that there will be several hours in which the mule may partly digest and assimilate this bulky feed before going to work.

Mules like to roll after being unharnessed, and they should have a place where they may enjoy themselves in this way. Moreover, they will be much more comfortable in summer if they are turned out on pasture at night after they have cleaned up their feed. When turned onto pasture at night they will sweat more the next day, but the beneficial effects obtained from the grass and being in the open will more than offset the effects of excessive sweating. If one is unable to supply pasture for the mules at night during the summer, a paddock or lot should be provided where they may be comfortable.

JUDGING MULES

The general form and appearance of the mule should closely resemble that of a horse, and in judging mules the same general points of perfection are to be looked for. The nearer the mule approaches the ideal desired in a draft horse the more valuable he is from a market standpoint. In the mule there are certain characteristics derived from his paternal side which are mainly indicated in his bray, disposition, ears, tail, and feet, aside from which the mule does not differ materially from the dam.

Mules vary in height from the little 12-hand pit mule to the large draft mules standing 17½ hands. The range in height of various classes of mules is given in another portion of this bulletin under Market Classes of Mules.

The weight of mules ranges from 600 to 1,600 pounds. The average weight of the larger type of mules ranges between 1,150 and 1,400 pounds and is the range of weight within which the majority of marketable mules are classified.

The form of the mule should be compact, with a deep body, broad chest, full flanks, short back, and well-sprung ribs. Light, waspy flanks, long, narrow bodies, and long backs are not desirable.

Quality is rather difficult to define, but is that which every capable judge looks for in any animal. It is indicated in the mule by a trim, fine ear, clear-cut head and joints, flinty, flat bone, well-defined tendons, and soft hair. Quality often marks the difference between a "market topper" and a "jar head." A short, thick ear, a coarse head, round, spongy bone, and a hard coat of hair are indications of poor quality against which the judge should discriminate.

The natural tendency of the mule is to be lazy and obstinate. An active, energetic mule is therefore much desired.

It is in the hindquarters of the mule that the greatest faults of conformation are usually found. The croup is often very short and steep, the hips too sloping, the thighs too narrow, the bone too light, and the hind legs sickle-shaped. These are faults of conformation that judges discriminate against sharply. It is in the hindquarters and loins that the draft animal obtains propelling power. These portions of the animal, therefore, should be correctly built and properly developed. The loins should be broad, short, and thickly muscled; the croup long and level; the hips long, level, and muscular; the thighs thick, long, and well-muscled; and the hind legs well-set, with broad, clean-cut hocks, and flat, dense bone. Also, the mule should stand on sound, well-shaped feet.

Although the mule is essentially a draft animal, it is often used for general-utility purposes, especially in the South. Style and action may not be as important qualities in a mule as they are in the light breeds of horses, but when present they add materially to its value. A smart, alert mule, with a long, free stride at the walk and a snappy, balanced trot is highly desired. Figure 7 and

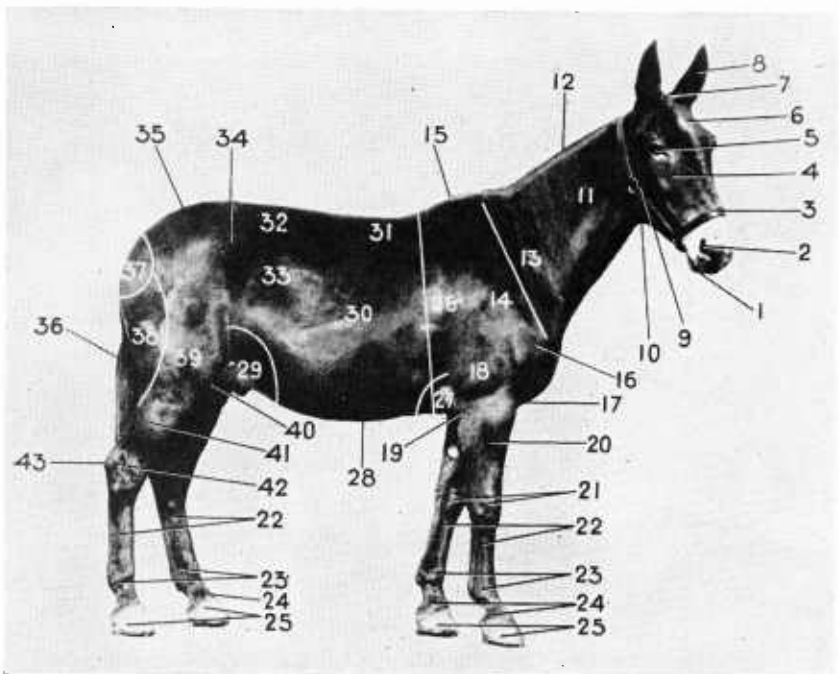


Figure 7.—The points of the mule: 1, Mouth; 2, nostril; 3, nose; 4, face; 5, eye; 6, forehead; 7, poll; 8, ear; 9, lower jaw; 10, throatlatch; 11, neck; 12, crest; 13, shoulder bed; 14, shoulder; 15, withers; 16, point of shoulder; 17, breast; 18, arm; 19, elbow; 20, forearm; 21, knees; 22, canons; 23, fetlocks; 24, pasterns; 25, feet; 26, heart girth; 27, foreflank; 28, underline; 29, hindflank; 30, barrel; 31, back; 32, loin; 33, coupling; 34, hip; 35, croup; 36, tail; 37, buttock; 38, quarters; 39, thigh; 40, stifle; 41, gaskin; 42, hock; 43, point of hock.

the accompanying score card give points in the study of mule conformation.

SCORE CARD FOR THE MULE

Scale of points	Standard score	Points given animal judged	
		Student's score	Corrected score
GENERAL APPEARANCE—16 points:			
<i>Height</i> —Estimated hands.....; actual hands.....			
<i>Weight</i> —Estimated.....; actual.....; according to age and type.....	4		
<i>Form</i> —Broad, deep, compact, smooth, symmetrical.....	4		
<i>Quality</i> —Clean, dense bone with sufficient substance; refined head and ears; fine hair; well-defined joints and tendons.....	4		
<i>Temperament</i> —Active; good disposition.....	4		
HEAD AND NECK—7 points:			
<i>Head</i> —Proportionate; clear-cut features.....	1		
<i>Forehead</i> —Broad, full.....	1		
<i>Eyes</i> —Full, bright, clear.....	1		
<i>Muzzle</i> —Broad, fine; large nostrils; trim and even lips.....	1		
<i>Ears</i> —Large, long, pointed, fine, well set, carried alert.....	1		
<i>Neck</i> —Long, muscular, clean-cut throatlatch.....	2		
FOREHAND—24 points:			
<i>Shoulders</i> —Long, sloping, smooth, muscular, blending into smooth, well-defined withers.....	3		
<i>Arms</i> —Short, muscular, elbow in.....	1		
<i>Forearms</i> —Long, wide, muscular.....	2		
<i>Knees</i> —Straight, wide, deep, well supported.....	2		
<i>Cannons</i> —Short, wide, flat, well-defined tendons.....	2		
<i>Fellocks</i> —Wide, straight, tendons well back, well supported.....	1		
<i>Pasterns</i> —Of medium length, oblique (about 45°), clean, strong.....	3		
<i>Feet</i> —Of medium size, set straight; dense, smooth horn; slope of wall parallel to pastern; wide, high heels; concave sole; strong bars; prominent, elastic frog.....	6		
<i>Leg position</i> —In front, a perpendicular line from point of shoulder should divide the leg and foot into lateral halves; from the side, a similar line from the bony prominence on shoulder blade should pass through the center of elbow, knee, and pastern joints, and meet the ground back of foot.....	4		
BODY—9 points:			
<i>Chest</i> —Deep, wide.....	2		
<i>Ribs</i> —Long, well sprung, close.....	2		
<i>Back</i> —Short, broad, strong.....	2		
<i>Loin</i> —Short, wide, muscular.....	2		
<i>Flanks</i> —Deep, full; long, low underline.....	1		

SCORE CARD FOR THE MULE—Continued

Scale of points	Standard score	Points given animal judged	
		Student's score	Corrected score
HIND QUARTERS—32 points:			
<i>Hips</i> —Wide, level, smooth, muscular.....	2		
<i>Croup</i> —Long, level, muscular.....	2		
<i>Tail</i> —Set high, well carried.....	1		
<i>Quarters and thighs</i> —Deep and muscular; strongly jointed to gaskins.....	3		
<i>Stifles</i> —Broad, thick, strong.....	1		
<i>Gaskins</i> (Lower thighs)—Long, wide, muscular.....	2		
<i>Hocks</i> —Straight, wide, prominent points, deep, flat, clean-cut, well supported.....	6		
<i>Cannons</i> —Similar to front, but a trifle longer and wider.....	2		
<i>Fetlocks</i> —Wide, straight, tendons well back.....	2		
<i>Pasterns</i> —Similar to front, but less sloping (about 55°).....	3		
<i>Feet</i> —Similar to front, but not quite as large.....	4		
<i>Leg position</i> —From rear, a perpendicular line from point of buttock should divide the leg and foot into lateral halves; from the side, this same line should touch the point of hock and run parallel to the cannon. A similar line from hip joint should meet the ground midway between heel and toe.....	4		
ACTION—12 points:			
<i>Walk</i> —Active, straight, balanced, long stride.....	7		
<i>Trot</i> —Straight, long, free, regular, snappy stride.....	5		
Total.....	100		

MARKET CLASSES OF MULES

On the large markets mules are classified according to their use. There are also various local market classifications of mules, but in general mules may be grouped in five classes. Each class includes mules of a general type, while there are various grades and weights within a specific class.

The general classes of mules are shown in table 2.

TABLE 2.—*Ranges in height and weight of various classes of mules*¹

Class	Range in height	Range in weight
	<i>Hands</i>	<i>Pounds</i>
Draft.....	16 to 17½	1,200 to 1,600
Farm.....	15½ to 16	900 to 1,250
Sugar.....	16 to 17	1,150 to 1,300
Cotton.....	13½ to 15½	750 to 1,100
Mining.....	12 to 16	600 to 1,350

¹ From Bul. 122, Illinois Agricultural Experiment Station (second edition) Market Classes and Grades of Horses and Mules.

Each of the classes is divided, according to conformation, soundness, quality, condition, and action, into the following grades: Choice, Good, Medium, Common, Inferior.

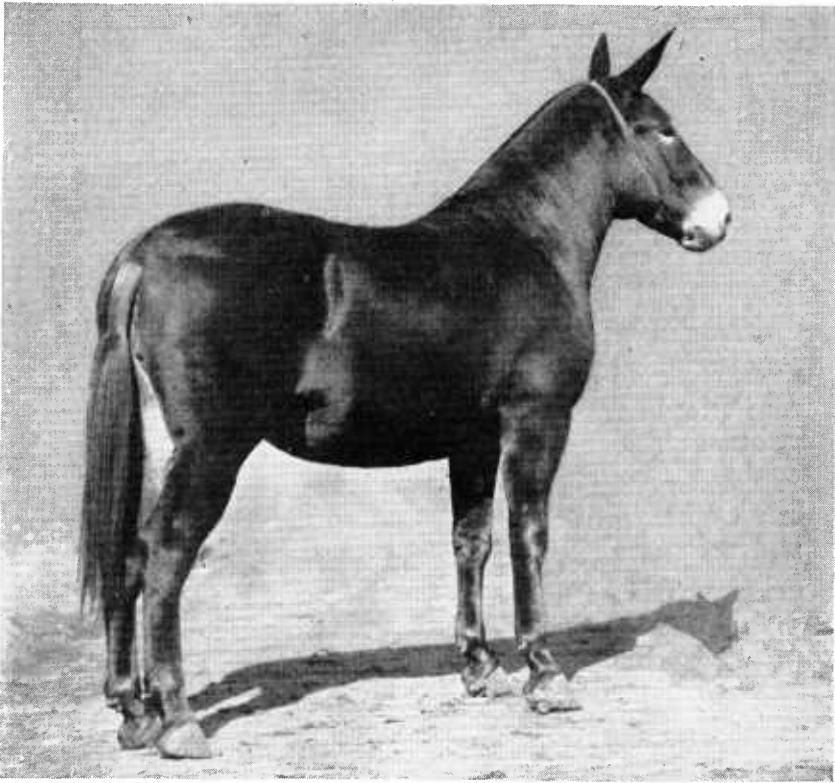


Figure 8.—A choice draft mule.

DRAFT MULES

The draft-mule class includes the largest mules (figs. 8, 9, and 10), standing from 16 to 17½ hands high and weighing from 1,200 to 1,600 pounds. Some exceptional draft mules exceed the maximum weight given for this class. Draft mules are used principally for heavy teaming in large cities, especially in the warmer climates; for contract jobs, such as road grading and railroad work; and for lumber work. Mules used for contract work are generally designated by an appropriate descriptive name, such as "railroaders." The heaviest draft mules usually find their way to the lumber camps. Contract mules must have more quality than lumber mules, but extreme weight is not so essential. The greatest demand for draft mules is for those between the ages of 5 and 8 years.

There is no special preference in regard to sex. The highest prices paid are for those mules having weight combined with heavy bone, large, well-shaped feet, strong, short backs, closely coupled with abundant muscling over the loin and hindquarters.

FARM MULES

Mules purchased on the market for farm work in the Middle Western States are known as "farm mules." There is more variation in quality and type in this class than in any other class, as the demand for a specific type is not so well defined (figs. 11, 12, 13, and 14). Mules in this class may be plain draft mules or cotton mules that lack finish and condition, as the farmer often likes to buy mules with a prospect of developing them into more valuable animals. Many of them are worked for a season and then fitted for the market, where they are placed in one of the other specific classes, such as "drafters," "sugar mules," or "cotton mules."

SUGAR MULES

Sugar mules are those which are purchased for shipment to the sugar plantations of the South. This class of mules is somewhat rangy in type and should have good quality, style, and finish. The mules in this class are heavier and more compact than cotton mules, but are not so heavy as draft mules. The range in weight is from 1,150 to 1,300 pounds. In selecting sugar mules special attention should be given to quality and adaptability to the work. The feet should be large and well-shaped. Mare mules are preferred for the sugar trade (figs. 15, 16, and 17).

COTTON MULES

As the name implies, cotton mules are purchased for work on cotton plantations. The typical cotton mule (figs. 18, 19, and 20) is somewhat lighter and more angular than the sugar or surface-mining mule but is heavier than the pit mule. While there is a considerable gradation of quality and age in this market class, the planters of the South are becoming more and more inclined to favor increased weight and quality in their mules than prevailed a few years ago. A Choice cotton mule weighs about 1,150 pounds and is alert and active, but most mules in this class range from 750 to 1,100 pounds. The age limits within this class are variable. Mules from 5 to 7 years old are preferred, however, for this trade and bring the best prices.

MINING MULES

There is a wide range in weight among mining mules, varying from 600-pound pit mules to 1,350-pound surface mules (figs. 21, 22, 23, and 24). Good feet and freedom from blemishes are requirements for mules that qualify for top prices for the mining trade.

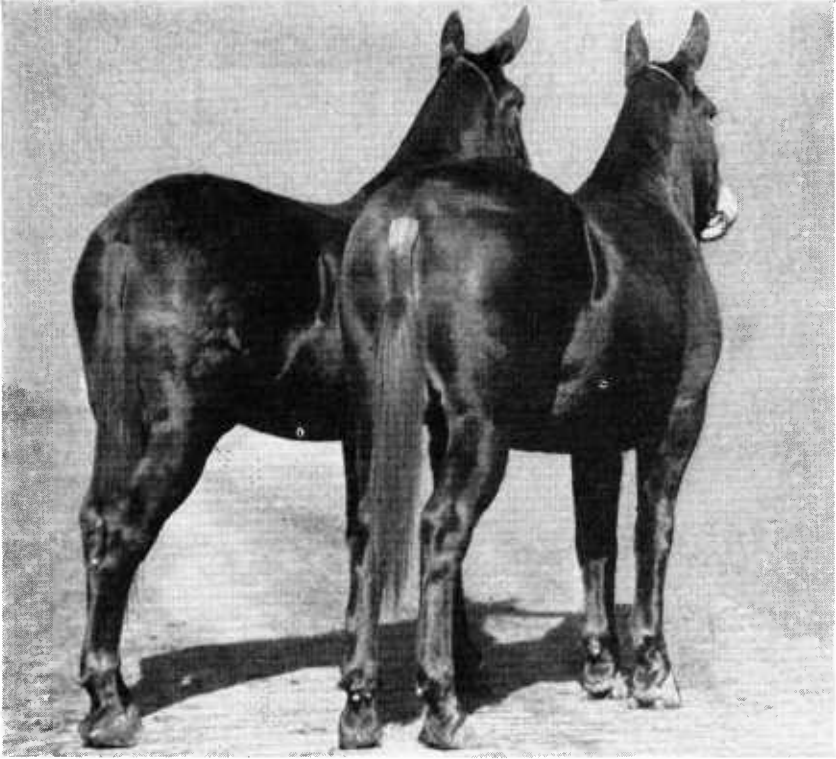


Figure 9.—A pair of Choice draft mules.

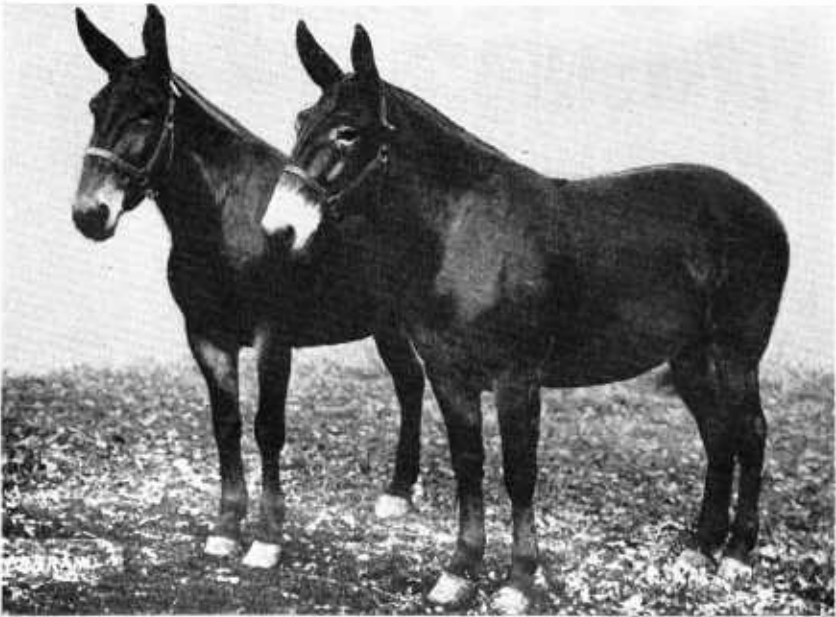


Figure 10.—A pair of Good draft mules.



Figure 11.—A pair of large farm mules.



Figure 12.—A Good farm mule.

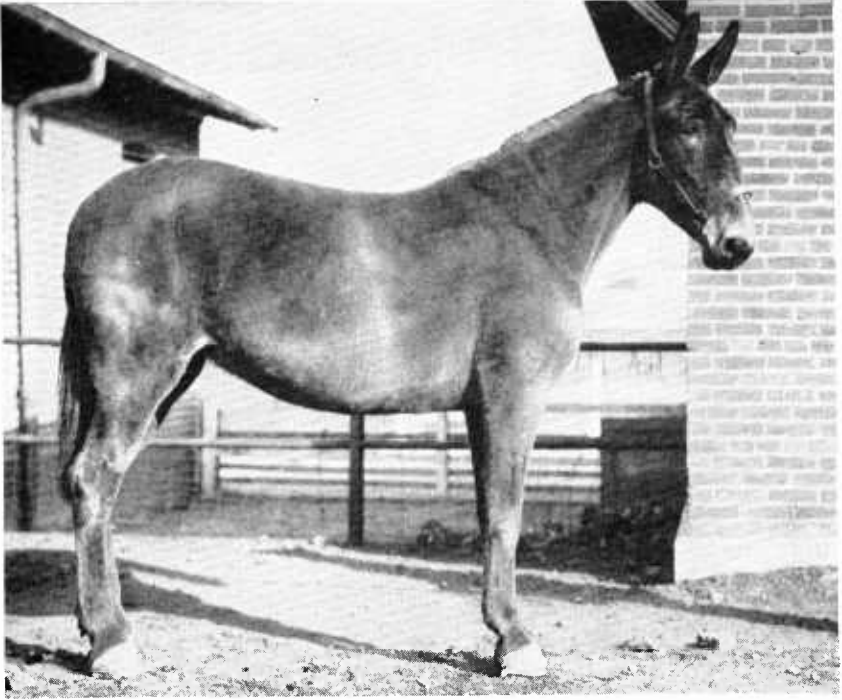


Figure 13.—A Medium farm mule.

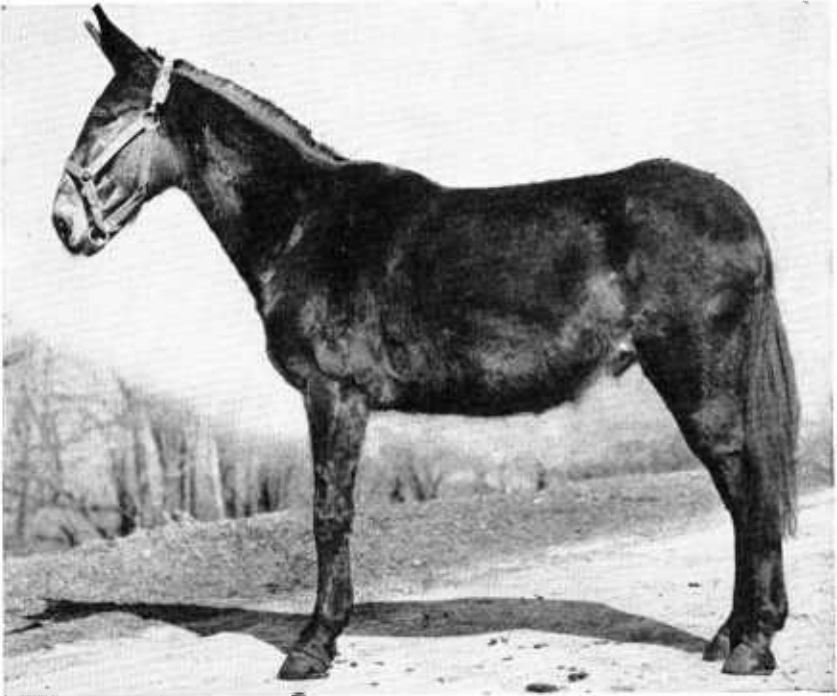


Figure 14.—A Common farm mule.

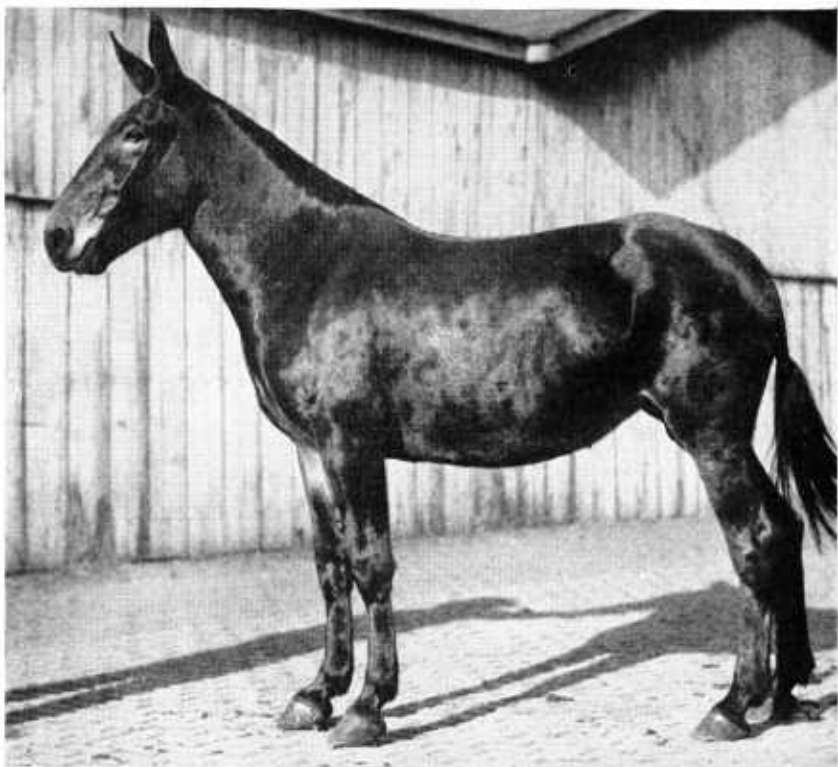


Figure 15.—A Choice sugar mule.

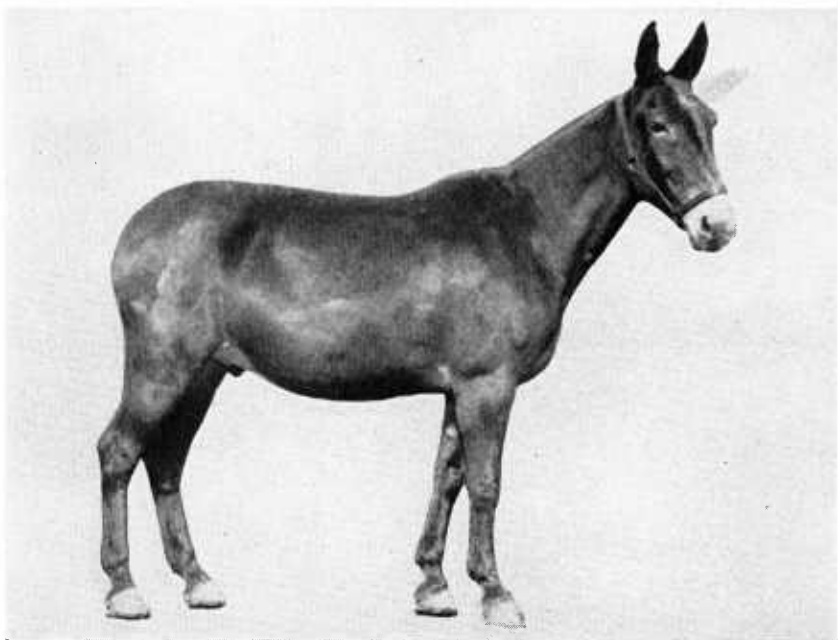


Figure 16.—A Good sugar mule.



Figure 17.—A Common sugar mule.

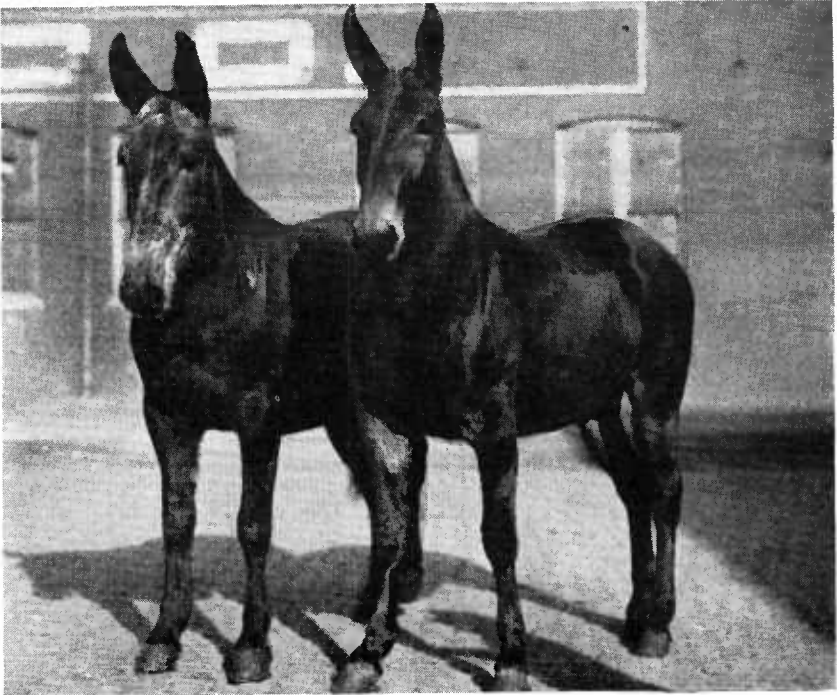


Figure 18.—A team of Choice cotton mules.



Figure 19.—A Good cotton mule.



Figure 20.—A Medium cotton mule.



Figure 21.—A team of Choice surface mining mules.

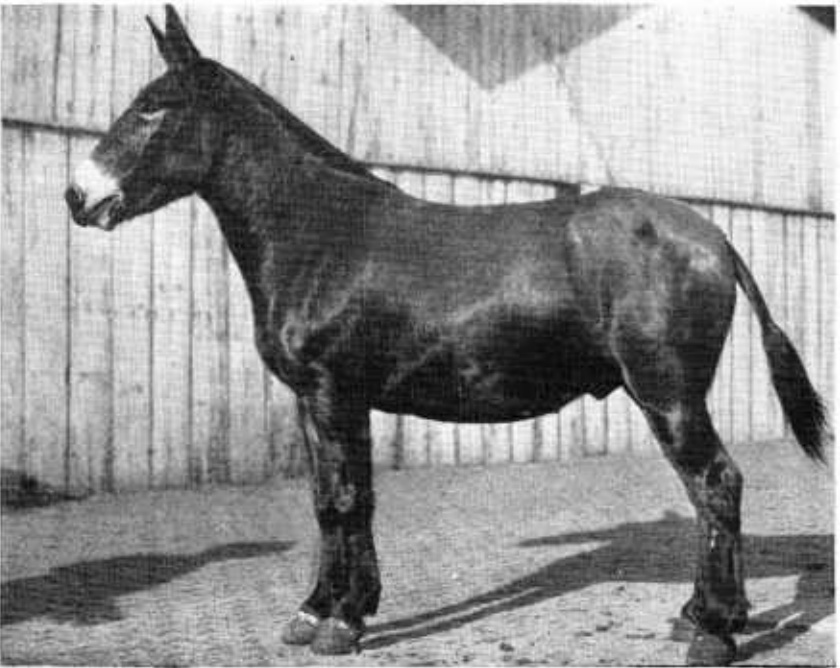


Figure 22.—A Choice surface mining mule.

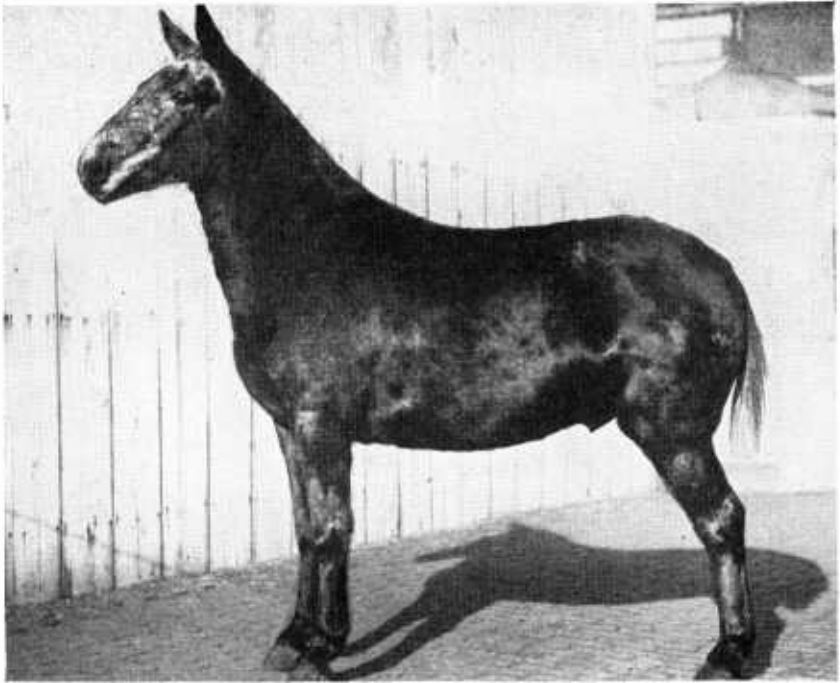


Figure 23.—A Choice pit mining mule.

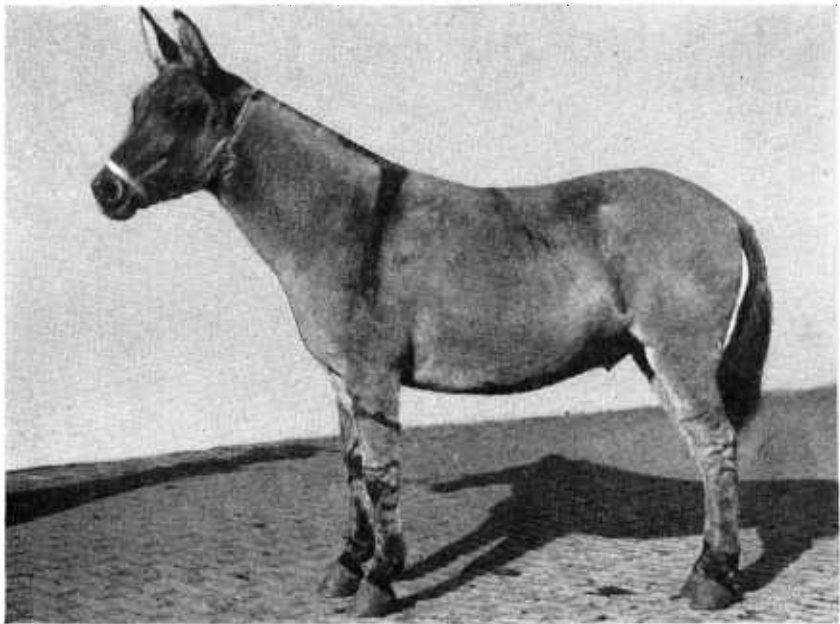


Figure 24.—A Good pit mining mule.