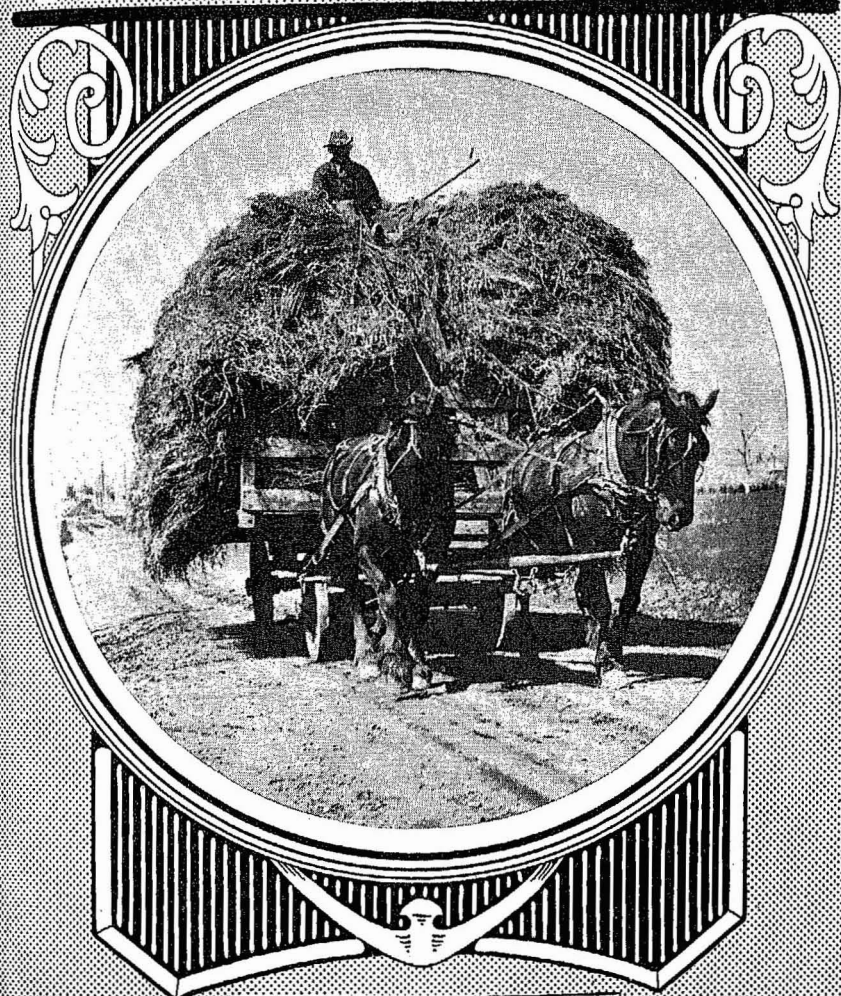


HORSES



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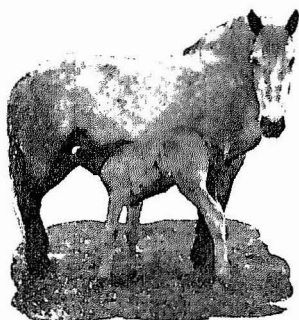
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HORSES

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This publication is issued by the Montana Agricultural Extension Service to present factors bearing on the horse industry in Montana, to outline methods of feeding and management of all classes of draft horses and to discuss certain procedures for marketing surplus horses.

Montana, with her good grass, where horses may graze the year around, with a surplus of cheap roughages in the irrigated valleys and with a supply of foundation stock is probably as well equipped to raise horses as any state in the Union.

In the irrigated valleys and farming communities of the state, where there is a surplus of roughages, horses are still the cheapest source of power. This is especially true where short hauls over bad roads are necessary. The return of the lumber industry in the western part of the state will bring with it a demand for heavy horses to work in the woods.

OPPORTUNITY FOR HORSE BREEDING IN MONTANA

Horses on United States' farms reached their highest number in 1919 after having maintained a level for ten years. But, while horses have declined in numbers every year since 1919, mules gained in numbers until 1925 so that the reduction in the total numbers of work animals has been less in proportion than in the case of horses alone.

Because of substantial price premiums over horses the mule business continued brisk after the decline in horse breeding had set in. The high level of activity of the southern cotton and tobacco industries through 1929 favored mule markets. The tractor as yet has made no such inroads on animal power in the south as it has in the north and west.

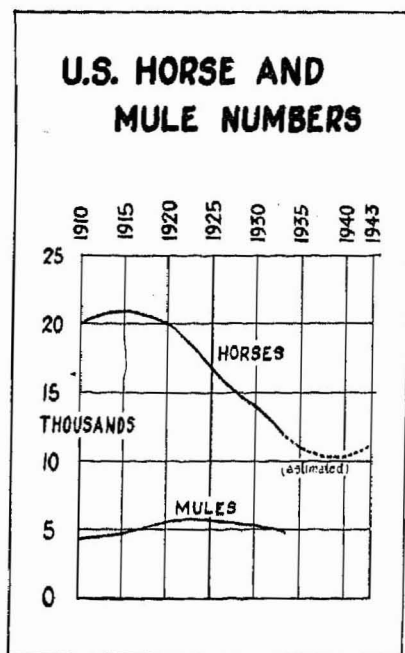


Fig. 1.—There are fewer horses and mules.

Not only are horses low in total number but the average age is so advanced that a quick upturn in horse population is not possible. There are actually more horses over 12 years of age than under. More horses reached twenty the spring of 1933 than reached seven or any one younger age. The number of colts foaled in 1933 will be less than one-fourth the number foaled in 1917.

During those periods when horse numbers were being maintained, about 33 per cent of the total horse population was made up of mares from five to fifteen years. While the proportion of brood mares has declined to only 29 per cent of the total horse population, there are five 15-year-olds for every three 3-year-olds.

Even if, beginning in 1933, as high a percentage of all mares should be bred as was the case during the ten years immediately before the World War, horses are so old that for several years they will die faster than foals possibly can replace them. Stallions are so scarce and the need for full-time work animals so urgent that this high level of breeding cannot be reached immediately. But assuming that it could, what can be looked for in connection with horse numbers in the next ten years? With such breeding activity numbers would continue to decline until 1937 when there would be

From 1919 to 1933 the number of all work stock dropped 35 per cent while horse numbers declined 43 per cent. Breeding operations in late years have been so limited and the death rate so high that in the last five years this country has lost 16 per cent of all its work animals.

So short has the supply of work animals become that during 1932 horses were the only farm product of nation-wide importance to show a gain in market price. This gain was made during a year when average prices of all farm commodities declined 20 per cent. Horses and mule prices continued their rise through the early months of 1933.

Only when more and very proper attention is turned to increased breeding of work stock is the truly astonishing depletion of the horse breeding plant uncovered. Regardless of what heights the horse market may reach, horses' numbers will continue to decline for several years.

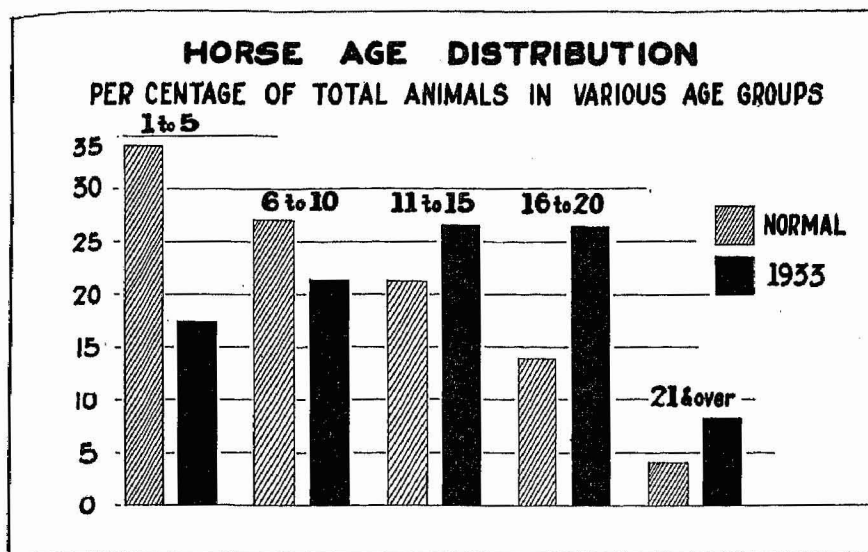


Fig. 2.—A significant picture of horses by age groups.

eleven head for each lot of twelve in 1933. By 1943 the horse population still would not have come back to the low level of 1933.

It is probable that total numbers will decline to a point lower than suggested and that more than ten years will have passed before numbers come back to the 1933 mark.

DRAFT TYPE

In selecting stallions and brood mares for the raising of colts the breed is not so important, but the type of the horse selected is very important. The question often arises as to which is the best breed of horses for all purposes. There is no best breed for all conditions. The good-typed horses of each of the breeds have their place. One rancher may have good results with one breed while his neighbor enjoys equal success with another breed.

Throughout Montana where draft foals as well as work horses have to depend upon cheap winter feed or grass in the winter, it is necessary to raise horses that will be easy keepers and will mature into draft horses weighing from 1400 to 1600 under rather adverse winter conditions.

Good breeding stock should be sound, of generous size, and should show good type, form and feeding capacity. They should show character in the head, have a clean cut neck of medium length that blends well into an even-sloping, well-muscled shoulder. The back should be short and well-muscled, the ribs well-sprung, the body deep, and the coupling short. The croup should



Fig. 3.—A pair of well-matched drafters—weight 3600 lbs.

be long, level, and well-musceled, this muscling to carry down deep into the quarters, stifle, and gaskin. The underline should be long, and the flank should be low. The chest should be deep and wide.

The old adage, "No foot, no horse" is quite true. It is quite necessary for the horse to have a good set of feet and legs. The legs should be of medium length and squarely set under the horse. The joints should be fairly large and clean and the bone large, clean, and flat. The pasterns should be round and sloping. The feet should be large, round and deep, with the hoof showing good texture. Action is important. The horse should move out at the walk and trot with a long, straight, springy stride showing plenty of knee and hock action.

Stallions, mares or geldings of the type described will always find a buyer.

Selecting Stallions

Stallions should be selected with great care as they usually represent a fairly large investment. They should be absolutely sound, show excellent type and have plenty of size, weighing between 1900 and 2000 pounds at maturity. The stallion should be clean around the hoof, head and pasterns and have a deep, wide, clean hock. He should also be carefully examined for blindness. Test his wind by first exercising him briskly and then by stopping him suddenly; close observation will reveal faulty breathing.

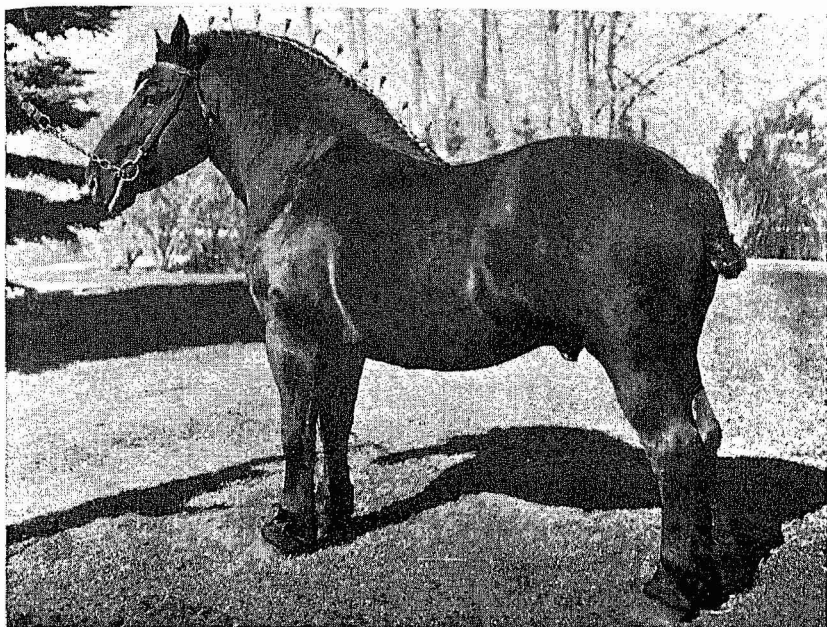


Fig. 4.—A good type of purebred Percheron stallion.

The head should be clean cut and yet show boldness and masculinity; the eye large and bright. The neck should have plenty of length with well-developed crest and clean throat latch. The muscling should be well developed throughout, and the body deep and wide. It is very essential that the stallion show more bone and substance than mares.

At the walk the stallion should take a long, straight and free stride while at the trot his action should show boldness and power, he should flex the hocks well and show plenty of height in the knee action. He should show lots of substance, strength, endurance and durability and yet have quality, character and style.

Age to Breed

A well grown out two-year-old stallion can be safely used to breed 12 to 15 mares a season providing he is carefully handled. He should not breed more than two mares per week. The three-year-old can take care of 30 to 50 mares; the four-year-old, 50 to 75 and the mature horse 75 mares or more. The mature horse should not breed more than two mares per day, one

in the morning and one in the evening. The number of mares one stallion can serve will depend largely upon his feed, care and exercise, and the length of the breeding season.

Range Breeding

There are numerous systems of breeding on the range practiced in the west; space does not permit the discussion of the merits of each one of them. However, one system that has met the approval of many horsemen is as follows: Keep the stallion in a corral during the first part of the breeding season and corral the mares once a day. Thus it is possible to detect a mare that is in heat and she can be cut into the corral with the stallion and bred. A ridgling can be used with the band of mares as a teaser horse. After a period of 20 to 30 days most of the mares will probably have been bred. Then the stallion can be turned on the range with the mares for the remainder of the breeding season. In this way a stallion is able to take care of more mares than if he is turned with the band at the start of the season, and it is possible to get a greater percentage of the mares with foal. A mature stallion handled this way should be able to take care of about 60 to 75 mares. A stallion that is turned with the mares at the start of the breeding season will handle about 50 mares. The stallion should not be allowed to run with the mares more than 90 to 100 days.

Working Stallions

Where it is at all possible it is an excellent idea to work the stallion. In France practically all of the stallions are satisfactorily worked and are almost as easy to handle as mares and geldings. They should be broken at two or three years of age and, if they are carefully handled, they will do as much work as any other horse. During the breeding season, they should not be worked more than half a day, but when not in service, they can work full time.

The stallion should be worked with a gentle, easily-handled mare, preferably a bred mare. It is available to use a jockey stick when breaking the stallion. However, after he is well broken, it is not necessary to use the jockey stick.

Selecting Brood Mares

Factors to be considered in selecting mares for foundation stock are: general conformation, conditions under which the foals are to be raised, purpose for which the horses are intended when grown, and financial outlay necessary for the start.

The general conformation of the mare should be the same as that given for the stallion except for the sex characteristic differences. The mare will be smaller and show more refinement throughout. Mechanical injuries, such



Fig. 5.—A pair of range-raised $\frac{3}{4}$ and $\frac{7}{8}$ -blood Shire mares—weight 3000 lbs. They raise good colts and do their share of the work.

as wire cuts, will not impair her breeding ability as long as she is able to get around well enough to care for herself and foal.

In Montana foals are raised on the open range or on the farm. Most of the state's range mares carry some draft blood, and, because of adverse winter conditions, they are comparatively small, weighing 1000 to 1400 pounds. A selection of the better individuals of these range mares will make good foundation stock for a range breeding herd. Horses raised to maturity from these mares and good purebred draft stallions weighing from 1800 to 2000 pounds, should weigh 1400 to 1600 pounds if properly grown out.

Ranch-raised horses should be from mares weighing 1400 pounds or better. These colts cost more to raise but should be larger and demand a better price than the range-raised horses.

Different classes of horse power demand different types and sizes of horses. Corn belt farmers use a variety of horses from the 1200-pound southern chunk to the 1600 to 1800-pound drafter. Western logging camps use the heavy, plain upstanding drafters weighing 1600 pounds and up. The range horse breeder, with cheap or free range is in a good position to supply the corn belt trade as these horses must be raised cheaply. Farm chunks weighing 1200 to 1400 pounds off the range at four years old, will continue to grow after being broken if they are well fed, and this makes them very desirable for the corn belt farmer.

Before purchasing mares for a breeding herd, it is well to consider the cost of producing horses under given conditions and the future possibilities

of the horse market. It is at least four years from breeding time until the horse is ready for market.

Ranchmen who have a supply of mares can get into the business with very little cash outlay. The purchase price of the stallion is the only cash needed.

Breeding

Well-grown three-year-old fillies may be bred to foal at four years old. Mares bred at this age seem to develop into more regular breeders than those allowed to go dry until four years old or older. The breeding season

of range mares should be arranged so that the colts arrive after the grass has a good start. Farm mares that are to be worked should foal before spring work commences or between heavy spring work and harvest time. Most mares will show a heat period nine or ten days after foaling. The rancher who plans on raising a foal each year from each brood mare should practice breeding them back at this time. Mares that are suckling foals are more liable to become settled safely in foal when bred on the ninth or tenth day after foaling than if bred during subsequent heat periods. The following gestation table may be used as a guide in arranging breeding dates. The gestation period of mares is usually eleven months, but may vary from 300 to 400 days. The average period is 340 days.

Gestation Table for Mares

DATE SERVED	DATE TO FOAL
January 1.....	December 7
January 16.....	December 22
January 31.....	January 6
February 15.....	January 21
March 2.....	February 5
March 17.....	February 20
April 1.....	March 7
April 16.....	March 22
May 1.....	April 6
May 16.....	April 21
May 31.....	May 6
June 15.....	May 21
June 30.....	June 5
July 15.....	June 20
July 30.....	July 5
August 14.....	July 20
August 29.....	August 4
September 13.....	August 19
September 28.....	September 3
October 13.....	September 18
October 28.....	October 3
November 12.....	October 18
November 27.....	November 2
December 12.....	November 17
December 27.....	December 2

GENERAL MANAGEMENT OF HORSES

Care of the Feet

Generally, range horses keep their feet well worn down and need no special care. Farm raised horses should have their feet kept well-trimmed so they will not grow out of shape, develop cracks or flat hoofs. This trimming should be done with a pair of hoof nippers and a rasp. Sometimes the feet are trimmed with a long-handled chisel and hammer while the foot is in normal position. The objection to this method is that the operator is unable to see what he is doing. The trimming should follow close to the sole of the

foot which is best seen when the foot is held high up. It is better to trim with a chisel than to let the feet grow long.

Shoeing should only be done to protect the foot from wearing down until tender or to give the horse better traction. When horses are shod the shoe should be made to fit the foot rather than the foot trimmed down to fit the shoe. Horses worked on gravel roads will have to be shod to protect the feet. Horses working in the field at such work as plowing, harrowing, etc., are better off with no shoes. Heavy calked shoes are often the cause of hoof injuries, especially in big team hitches where the horses may trample one another in turning.

The feet of young horses should be in good shape at all times. The feet should be trimmed whenever it seems necessary to keep them level. Usually trim only the outer rim; sometimes it is necessary to shorten the toe or cut down the heel. In case the sole of the foot becomes infected it should be trimmed out and thoroughly disinfected.

Care of the Teeth

The foal usually has no teeth trouble. Permanent teeth start replacing milk teeth at two years old. The teeth of horses from two to five years old, should be examined occasionally to see that the milk teeth are dropping out before the permanent teeth appear. Milk teeth that do not shed at the proper time should be pulled so that the permanent teeth will come in straight and in the proper place. Grinders, or jaw teeth that do not shed at the proper time may become sore or stand up above the others and prevent proper mastication of feed. It is difficult to examine back teeth without a mouth speculum. Sometimes abnormal teeth can be located by feeling along



Fig. 6.—A well-matched Percheron six-horse team. Economical power for short hauls.

the outside of the jaw. If no speculum is available an examination may be made as follows: Reach into the mouth just back of the front teeth, grasp the tongue with the right hand, pull it out of the mouth on the left side and thrust the left hand into the right side of the mouth until the extreme back teeth can be felt. Then transfer the tongue to the left hand and pull it out on the right side of the mouth; insert the right hand into the mouth on the left side until the rear teeth are reached. Horses' teeth are always rough but an abnormally long tooth can be felt.

This method of examining teeth is rather crude and dangerous to the operator but may be employed in case of an emergency. When the horse's tongue is well pulled out of the mouth it will be between the teeth on the opposite side from the hand leaving little chance for injury from biting. Long teeth or exceptionally sharp pointed teeth should be cut off or "floated." Because of the fact that the horse's lower jaw is slightly narrower than the upper he may wear the upper teeth shorter on the inside edge. The lower teeth will be worn short on the outer edge. These long edges may become very sharp and cut the cheek and tongue. They may be floated down with a protected rasp.

Care in the Stable

Farm horses are stabled as a matter of convenience to the farmer rather than for the comfort of the horses. Except in very severe weather horses are better off in a good pasture or a feed lot where they can eat and drink at will. If stabled the stall should be dry, well-bedded and large enough for the horse to lie down in comfort. Two horses that will stand together have more room in an eight foot double stall than one horse in a four foot single stall. Single stalls for horses over 1400 pounds should be five feet wide. One or more box stalls ten to twelve feet square are very convenient for foaling stalls and may be used as a double stall for a span of horses. Feed boxes for grain should be separated by a partition high enough so one horse cannot steal grain from another. Divisions between stalls should be made of heavy two-inch planks or four-inch poles. The floor of the stall may be clay, a mixture of clay and gravel, three-inch planks, poles or concrete covered with two-inch planks. Horses should not be required to stand or lie on the bare concrete. The stable should be considered as a shelter from a storm rather than a place to keep the horses warm. An excess of ventilation is better than not enough. Horses should not be required to stand in the stable over Sunday or on rainy days when not working. They are much better off in a lot or pasture.

Fitting Harness

Collars should be properly fitted in order to prevent sore shoulders and necks. Horses with straight shoulders and wide necks should be fitted with a half or full sweeney, while horses with well-shaped shoulders can

be fitted with the regular or full-faced collar. The collar should not be too short. When set on the neck there should be 2 to 2½ inches space between the bottom of the collar and the lower part of the neck. This depends somewhat upon the way the horse carries his head. A collar this long will not choke the horse down when he is given a hard pull. A collar that is too short often causes a sore neck.

The collar should be of such width as to fit fairly snug along the side of the neck. A collar that is too wide often galls the shoulder; if too narrow it may gall the side of the neck. Some adjustments can be made with the hames if the collar is too wide. A properly fitted collar and hame will often prevent sore shoulders, necks and swellings on the young horse. A collar that fits well on the fat horse generally is too large when he is worked down. This should be watched and adjustments made. The use of collar pads should be discouraged but when it is necessary to use them the lighter weight kind with an oil cloth front are preferred. The face of the collar and the pads should be thoroughly cleaned each day.

The harness should be in good condition with no rough spots that might chaff the horse. It should be fitted to the horse to set well and still not be too tight.

COMMON MONTANA HORSE FEEDS

Because soil, climate, altitude and water vary considerably throughout Montana the feeds available on Montana ranches may differ considerably. However, while natural conditions may influence the feeding value of various concentrates and roughages, in general what can be said of a grain or roughage for one section will hold true for another section. Therefore it is advisable to present briefly the adaptability and feeding value of the various feeds available in Montana for the feeding of horses.

Concentrates

Oats. Oats for a great many years have been considered the standard grain for horses, the hulls insuring complete digestion of the grain. Oats are considered the safest grain to feed to horses, being equally suitable for foals, brood mares, work horses and stallions. They are fairly well balanced containing about the right proportions of protein, carbohydrates and fats to take care of the requirements for the various classes of horses. Grinding the oats is an unnecessary expense as grinding only causes five per cent more efficient digestibility. This is more than offset by the expense of grinding unless the oats are very high in price. They can be fed as the entire grain ration or in combination with other grains very satisfactorily.

Corn. Although in the corn belt corn ranks second to oats as a concentrate, in most sections of Montana corn is usually too high in price to be used as a horse feed. Corn is not considered as safe feed as oats even though one pound of corn actually furnishes more energy than one pound of oats.

If corn is fed in the summer, it should not comprise more than one-half of the grain ration. Some horse men feel that corn "burns out" a horse if fed in large quantities as the sole concentrate, especially in warm weather. In order to get the best results when feeding corn, some nitrogenous roughage, such as clover or alfalfa, should be supplied in the ration. A grain mixture consisting of one-half corn and one-half oats makes an excellent grain ration for work horses. If corn is fed to foals, brood mares and stallions, it should be supplemented with a feed that will supply protein, ash, calcium and phosphorus, such as oats or bran. Corn can be fed on the ear, shelled or coarsely ground.

Barley. Barley is a grain similar to corn but is not as good a feed as corn and oats. However, in one trial at the Wisconsin Station it was found that barley was worth 10 per cent more as a feed for work horses than oats, but at the North Dakota Station, barley did not prove as efficient pound for pound. The best results are obtained from feeding barley when it is mixed with oats. Because of the hardness and smallness of the kernel, barley should be rolled, crushed or coarsely ground for horses. If the barley is ground too finely the meal forms a pasty mass when mixed with the saliva in the mouth and thus becomes hard to digest. Because barley is not as bulky as oats, there may be slightly more trouble from colic when it is fed. However, it is generally considered a fairly safe feed.

Wheat. Usually the price of good wheat prohibits its use as a horse feed. Frosted or damaged wheat, if not mouldy, can be fed; also, when good wheat is cheap it may be fed with economy. Wheat should be rolled or crushed and fed in moderate amounts or as only part of the grain ration. If it is ground too finely, it forms a doughy mass and packs in the stomach tending to cause colic, especially when it is fed in large amounts and when it is the sole grain in the ration. Wheat is carbonaceous and gives best results when supplemented with a nitrogenous grain or hay. Not more than one-half of the grain ration should consist of wheat.

Emmer or "Speltz". Emmer is somewhat like oats, the grain kernel being inclosed in a hull that comprises about 21 per cent of the total weight. This feed is higher in carbohydrates and lower in protein than oats. It is comparable to barley as a feed for horses but it is not as palatable or as easily digested. It should be fed with a more bulky concentrate like bran or oats and horses should be started on this feed very gradually until they become accustomed to it. For best results emmer should be crushed or coarsely ground.

Rye. Rye can be used only in a limited way for horses. It should be coarsely ground and mixed with some bulky concentrate and should not exceed one-fourth of the grain ration. Rye is not especially palatable to horses and is liable to produce some digestion disorders when fed as the only grain or if the change to rye is made too abruptly.

Beet Molasses and Other Beet By-Products. Beet molasses should be fed only in limited amounts due to its laxative effect on horses. When not fed to excess it has given very good results. It may be thinned with warm water and fed with straw, fodder or dried beet pulp. Straight dried pulp is unpalatable to horses but when molasses is mixed with the pulp they will consume limited amounts. Molasses is high in carbohydrates and low in protein and should be fed only when low in price.

The practice of mixing beet molasses with straw and feeding this to teams has been observed and has proved to be satisfactory in beet districts.

Wet pulp is not desirable for feeding work horses although it can be fed to idle horses at the rate of 20 to 40 pounds per day. Feeding larger quantities may prove injurious.

Beet tops make a good feed for fattening horses in the fall. Horses are often pastured on beet tops after lambs have been pastured on them for a time.

Wheat Bran. Wheat bran is a bulky protein-rich concentrate that is very valuable as a horse feed. It has a mild laxative effect on horses. Usually bran is too high to be fed instead of home-grown grains. However, a small amount in the grain ration proves to be very satisfactory for work horses. It also is an especially good concentrate for mares, a few days before and after foaling, for growing foals, and, as part of the grain ration, for stallions. Bran seems to keep horses in a thrifty condition and causes the hair to shed. It is often fed to work horses on days that they are idle. The practice of cutting the grain ration in half and feeding one-half bran on days the horses are not working help to prevent colic and azoturia.

Wheat Middlings, Shorts. Although shorts furnish more nutriment than bran, they are not as desirable for the horse because of their heavier character. They should make up not more than one-fourth of the grain ration as they tend to produce colic. This danger seems to be greater with some horses than others.

Linseed Meal. Linseed meal is a high protein feed that can be satisfactorily fed with carbonaceous grains. Linseed meal is somewhat laxative and can be fed with the more constipating feeds. It is an excellent feed for getting horses ready for spring work, especially those that have been wintered on straw and are somewhat thin. It acts as a tonic in that it causes early shedding of the winter coat, improves the appearance and puts on fat. Only small amounts should be fed. One to one and one-half pounds per day mixed with the grain ration is sufficient. It is not very palatable but seldom is refused when mixed with the grain ration.

Cottonseed Meal. Cottonseed meal is not very palatable and is thought by some to contain a poisonous substance that might be injurious to horses. It should be fed with a laxative feed, and in amounts not to exceed one pound per day. Best results are obtained when cottonseed and linseed meal are mixed half and half and fed as a protein supplement to grain. It is not

necessary to feed cottonseed or linseed meal as a supplement when feeding such roughages as alfalfa or clover.

Roughages

Timothy. Timothy is considered the standard roughage for horses. It is one of the safest hays that can be fed. It is high in carbohydrates and fats but lacking in proteins and minerals, and therefore it should be fed with feeds high in these ingredients. Timothy is better as a roughage when fed with oats than with corn or barley. Timothy is especially well adapted for feeding work horses that are in the stable during their spare hours, and in Montana it is well adapted to the feeding of brood mares, stallions, foals and young horses. The best time to cut timothy for horses is when it is in full bloom or when the seed is in the early dough stage. At this time it is still fairly tender and yet is quite high in total digestible nutrients.

Wild Hay—Blue Stem and Bluejoint. The hay from these grasses as well as from other wild grasses is used widely in the western states as a roughage for horses. Analysis shows them to compare favorably with timothy. Trials at the Kansas Experiment Station determined that timothy is slightly better for horses than wild hay. Upland prairie hays in Montana used in practical feeding work apparently are slightly more valuable than timothy. Wild hay is just as safe to feed as timothy and like timothy should be fed with some feeds that will supply protein and minerals.

Alfalfa. Alfalfa is probably the most palatable of all hays for horses. It is high in digestible protein and has some minerals. It is especially well suited to feed with corn, barley and oats because it is more laxative than the carbonaceous hays and also because of its high digestible protein content. The alfalfa allowance should be limited to the amount each horse will clean up well or to 1 pound to 1.2 pounds per 100 pounds live weight daily if the horse is doing medium to hard work. If a horse is allowed to eat alfalfa at will he is liable to gorge himself, thus receiving an excess of highly nitrogenous material. This must be excreted through the kidneys, overworking these organs, and sometimes leading to a chronic inflammatory condition. Alfalfa should be free from dust and mold and should not be cut until it is practically mature. Hay that is dusty often causes heaves, and immature hay is generally too laxative for horses.

Clover Hay. Hay from medium red clover has about the same feeding value as alfalfa and is the same type of feed. It is palatable, fairly high in protein, and slightly laxative. Like alfalfa it is well suited to feed to horses that are receiving considerable corn, barley or oats. Clover should be fed at about the same rate as alfalfa, care being taken not to overfeed. Dusty clover should be avoided if possible. If clover hay becomes dusty it should be sprinkled before it is fed. On wet or poorly drained soils alsike clover does better than red clover.



Fig. 7.—Cutting oat hay at the North Montana Experiment Station, Havre.

Clover and Timothy. Clover and timothy grow well under the same conditions, therefore the two feeds can be grown together to make an ideal horse hay. The two should be sown so that the yield will be one-half timothy and one-half clover or 60 per cent timothy and 40 per cent clover. Hay from this mixture is much safer than straight clover, is better balanced than straight timothy and is an excellent roughage for all classes of horses. The mixture is adapted to irrigated sections but does not yield well on dry land.

Cereal Hays. Hays from the grains such as oats, barley and wheat are quite extensively used in the Rocky Mountain and Pacific slope states. They are palatable and compare fairly favorably with timothy and wild hay in feeding value. Some protein-rich feed should be fed with cereal hays. If there is a considerable amount of grain in the hay the allowance of concentrates should be reduced accordingly. Grains grown for hay should be sown at the usual rate or a trifle more heavily and the hay should be cut when the grain is in the late-milk or early-dough stage.

Straws. Straws from the small grains are useful for wintering horses. Little straw should be fed to horses at work. In feeding value straws rank in the following order: oat, barley, wheat and rye. Oat straw is more palatable and higher in digestible nutrients than the others. Horses should not be wintered with straw as the sole feed. A slight amount of hay or winter pasture should be available; otherwise it takes too much feed and too long a period of time to get horses in condition for spring work. When feeding alfalfa or clover hay as the main roughage to work horses, a small amount of straw can be used to good advantage.

Corn Fodder and Stover. Thickly grown fodder or bright well-cured stover are very good roughages for horses. Fodder contains the grain,

while stover has the grain removed and does not have as high a feeding value. Good corn forage is an excellent substitute for timothy in feeding idle horses, brood mares or growing horses. The practice of turning idle horses into the corn stalk field after the corn has been harvested is followed by many farmers. Horses will winter well on a corn stalk field when they also have free access to a straw pile. There is some danger of corn stalk disease however, and to avoid this the corn can be cut, shocked and fed after the fodder has properly cured.

Pasture. Good pasture will maintain idle horses very satisfactorily. However, for horses at hard work pasture without grain is insufficient. Legume pastures can be used as well as the tame and wild grass pastures, since the horse is not subject to bloat. The practice of letting work stock run on pasture at night and on days they are idle is an excellent method for keeping horses in thrifty condition. Work horses on pasture do not need other laxative feeds in their ration. Timothy hay and grains that do not have a laxative effect should comprise the daily ration in order to prevent horses on grass from getting into a too-laxative condition.

Minerals. In areas that are known to be mineral-deficient some mineral mixture should be provided for horses. Spent bone black is probably as cheap and readily consumed source of mineral matter as there is. It can be fed in the grain ration, or placed in boxes near the salting place in pastures. Any mineral mixture that has a noticeable odor may be refused and because of this bone meal is not recommended.

Goiter Areas. There are a few areas in Montana that have mineral deficiencies to the extent that goiter is prevalent among the new born foals. A large percentage of the foals die at birth and the ones that do live probably will not do well. To prevent this trouble mares during the gestation period should have free access to iodized salt—100 pounds of salt, and two ounces of potassium iodide, thoroughly mixed. Young foals should also have free access to this mixture.

Salt. Salt should be available for horses at all times. It should be fed free choice to horses on pasture. To work horses that are not turned out it can either be mixed with the grain or given at regular intervals. The average horse will consume between one-half and one and one-half ounces per day. A common practice is to add one pound of salt to every 100 pounds of grain mixture when feeding salt with grain.

Feeding and Management of Stallions

Stallions should be fed a ration rich in protein and ash at all times. When in service, stallions need plenty of nutritious well-balanced feeds that contain plenty of protein and minerals. Oats are an excellent grain to be used as the main concentrate. Bran and linseed meal also are very suitable for feeding stallions. Corn, wheat and barley can be used to a limited extent but are too fattening to feed as the sole concentrate.

The roughage fed should be good, clean, bright hay. Timothy is a safe hay but is not very nutritious. Alfalfa and clover are both palatable roughages but should not be fed in too great quantities. The most satisfactory roughage is clover and timothy 50-50 or 60 per cent timothy and 40 per cent clover. Alfalfa may be fed instead of clover. The amount of hay and grain fed out of breeding season depends upon the age, size and exercise of the horse. During the breeding season the number of mares being served also must be considered.

A general rule to follow is to feed three-fourths to one pound of grain and one to one and one-fourth pounds hay for each 100 pounds live weight during the breeding season. When not in service they should be fed just enough to keep them in a vigorous, healthy condition.

Following is a suggested ration for stallions not in service: 8 parts oats, 1 part bran, 2 parts barley, and timothy and clover hay.

Easy-keeping stallions will stay in good condition when fed one to one and one-fourth pounds of hay and one-fourth to one-half pound of the above grain ration for each 100 pounds of live weight. If the stallions are being worked, the grain ration, of course, must be increased.

Suggested rations for stallions in service:

Oats 6 parts	Oats 6 parts	Oats 6 parts
Bran 2 parts	Bran 2 parts	Bran 1 part
Barley 2 parts	Linseed meal 1 part	Barley 1 part
Timothy and clover	Timothy or wild hay	Alfalfa 50 per cent
		Timothy 50 per cent

Points to consider in caring for stallions:

1. Stallions should be fed carefully at all times and should be kept in good condition but not too fat.
2. They should receive plenty of exercise. Box stalls should be connected with paddocks where the stallions can run at will.
3. Paddock fences should be around seven feet high. A strong pole fence is the best; the stallions, being able to see out at all times, will exercise better.
4. Stallions kept in dark box stalls without regular exercise often become difficult to handle.
5. All breeding should be done in the same conveniently arranged place each time; to change the breeding place from time to time is a poor practice.
6. At no time should a stallion be allowed to serve a diseased mare.
7. Horses standing for public service, should be licensed by the State Stallion Registration Board. This is a protection for stallion owners so that they can collect service fees more effectively. The head of the Animal Husbandry Department, Montana State College, Bozeman, Montana, is the secretary of the Stallion Registration Board for Montana.

Feeding and Management of Brood Mares

Range mares will need very little attention except to see that they are on good range and to see that they are bred. With a little additional feed over that required for their gelding mates, farm-work mares often take their share of the load while suckling foals and carrying next year's foals. From breeding season to one month before foaling, mares in foul may be handled the same as geldings or dry mares except that when they are required to do heavy work they should have sufficient feed to maintain good condition. A month to six weeks before foaling, their work should be lightened slightly and care taken that they are not required to pull through mud or strain at exceptionally heavy loads. Heavy backing should be avoided. They may be worked at light work up to foaling time.

A few days before foaling mares should be turned in a green grass pasture to foal. If they have been doing heavy work and receiving a heavy grain feed, the grain should be cut in half. Oats are best at this time. On the day of foaling feed a bran mash. If no green pasture is available, or the weather is too severe, the next best place for a mare to foal is a clean, well-bedded box stall. The stall should be thoroughly cleaned and bedded with fresh straw just before foaling. Mares usually have very little trouble at foaling time if the foal is normally presented. The long legs, comparatively long, slim head and neck form a long cone which dilates the genital passage as the foal is forced forward. Abnormal presentation may cause trouble. Correction of these abnormal presentations is difficult. If it is a valuable mare, a competent veterinarian should be called.

Feed and Care of Foals

Foals born in the green pasture will likely need no assistance. Those born in the box stall should have their navel disinfected with iodine as soon as possible in order to prevent joint ill. It is important that foals get the colostrum or first milk from the mare because of its purgative effect. If fecal matter does not come 12 to 18 hours after they are born they should be given 1 ounce of castor oil and a rectal injection of warm soapsuds. If the mares are to be worked the foals should be kept in a box stall and some grain placed in a feed box that the foals can reach. A mixture of oats and bran makes an excellent concentrate for starting the foal to eat. The oats need not be crushed or ground. Foals should not be allowed to suckle the mares when they first come in from the field if they are very hot as the milk received at this time might cause colic. In case more than one mare that has a foal is worked, two or more foals can be kept together in a box stall or pole corral to good advantage. The foals then will be less restless than when kept alone.

Feeding the Orphan Foal

To feed the orphan foal, secure milk from a fresh cow that is a low tester. To one pint of this cow's milk add one-fourth pint of lime water in

which one teaspoonful of sugar has been dissolved. Heat the mixture to 100° F. and feed in a sterilized bottle with a nipple. At first, feed the foal about one-half pint every hour. Gradually increase the time between feeds and also increase the milk but be careful not to overfeed. After a few days, six feeds per day will be sufficient and later only four. At three to four weeks the adding of sugar can be discontinued, but the lime water should be continued. At five to six weeks gradually change to skim milk. After three months, four to six quarts of skim milk three times each day can be fed. The foal should be taught to drink from a bucket as soon as possible in order to save labor. Place a handful of grain such as whole oats or a mixture of one-half rolled oats and one-half bran, in the bottom of the bucket when feeding milk and the foal will soon learn to eat grain.

Work After Foaling

Mares may be returned to light work a week after foaling if they are normal. At the end of two weeks they will be ready for regular work, but while they are suckling the foals they should be favored as much as possible. Foals should not be allowed to follow the mares while they are at work as they are apt to get into machinery or get tangled in the lines and cause trouble. Foals should be left in a box stall or tied in their mother's stall, but care should be taken that they do not injure themselves in trying to get out.

FEEDING AND MANAGEMENT OF YOUNG HORSES

Feed and Care of Weanlings

Foals should be weaned when five or six months of age. If they are well grown out they will readily start eating hay and grain and will hardly miss their mothers. Weaning several foals together is a good practice as they will be less restless and will start eating more readily.

The following plan for feed and care of young horses from the time they are weaned until the spring they are three, has been adopted at Montana State College and has proved to be very satisfactory.

May and June foals are weaned between October 15 and November 1 and placed in a paddock adjacent to a partially open shed. They are started on a ration consisting of 4 parts oats, 2 parts bran and 1 part barley. This ration is given in small quantities at first, and gradually increased to 5 pounds per head daily. It is generally 30 to 40 days before they are receiving the full 5 pounds. All this time they get all the good bright timothy and clover hay they will clean up. They are fed twice daily. If the foals have not already been halter-broken, it should be done during the first winter. In this way they become gentle and easy to handle and will cause less trouble later on when at three or four years of age they are broken to work. It is also easy to halter break them at this period.

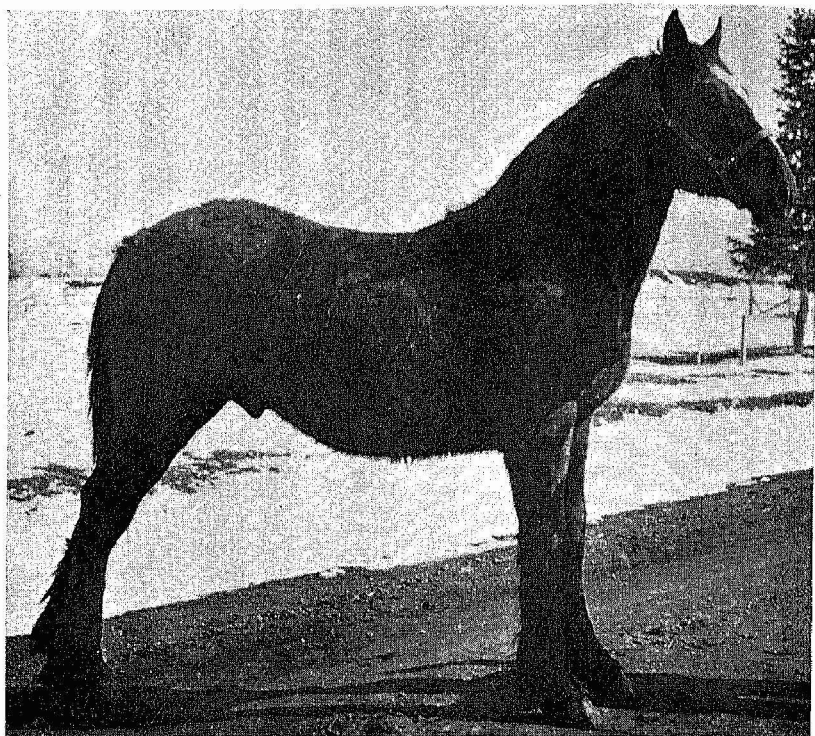


Fig. 8.—A well-grown, 11 months stud colt—weight 1100 lbs. Raised by Montana State College.

Along about March first the grain ration is increased to 7 or 8 pounds. This ration is maintained until May 15 when they are turned on grass. At this time the stud colts are castrated and turned out. Fed in this way, colts and fillies that are from a ton horse and mares weighing from 1600 to 1900 pounds will weigh from 1000 to 1150 pounds at 12 months of age. Colts and fillies cared for in this manner will attain about 60 per cent of their mature weight by the time they are 12 months old. Thus the yearlings have received over one-half of their growth during the period of their lives when it takes the least feed to put on 100 pounds of growth.

Feed and Care of Yearlings

From May 15 to November 1, the yearlings are carried on good pasture, either irrigated or dry land. About November 1 the young horses are placed

with the idle work horses and put on winter feed which consists of straw and winter grazing. It is a good policy to have a place with a good straw stack, preferably oat straw, adjacent to some fall and winter grazing on which the idle and young horses may run during the winter. Yearlings will lose some of their fat during the first winter on this type of feed, but their growth will not be impaired. Between February 1 and March 1 the yearlings are brought up and are fed hay until May 15, when they again go out on grass. These young horses may be a little thin at this time but they make an excellent growth the following summer as two-year-olds.

Two-Year-Olds

Two-year-olds are handled in the same way as yearlings as far as summer and winter feed is concerned, except that after March 1 as coming three-year-olds they are brought up to the barns and fed grain and broken. In this way they are fairly well hardened before going into heavy spring work, and can do considerable work as three-year-olds.

Weights and Costs

Raised in this manner, thirty-four-months-old geldings and fillies that are from a stallion weighing 2000 pounds and mares weighing 1600 to 1900 pounds, weigh from 1450 to 1600 pounds and at maturity will weigh from 1700 to 1900 pounds. However, these horses generally take a year longer to fully mature than if they are fed hay and grain each winter.



Fig. 9.—A pair of three-year-old grade Percherons raised by Montana State College method. Weight 3200 lbs.

Cost of Raising Geldings and Mares

Montana State College Method

Service fee	\$12.50
Per cent risk:	
Mare, \$100 at 3 per cent	3.00
Foal, \$25 at 25 per cent	5.00
Yearling, \$50 at 5.5 per cent	2.75
Two-year-o.d., \$65 at 4.5 per cent	2.93
Veterinary service and supplies	2.00
Care and shelter:	
First year	5.00
Second year	4.00
Third year	2.50
*Feed	
Six to twelve months:	
Grain, 1000 pounds at 60c per hundredweight	6.00
Hay, 2160 pounds at \$4 per ton	4.32
Twelve to 18 months:	
Pasture at \$1 per month	6.00
Grain, none	
Eighteen to 24 months:	
Hay, 1200 pounds at \$4 per ton	2.50
Winter pasture, 4 months at \$1	4.00
Twenty-four to thirty months:	
Pasture at \$1 per month	6.00
Thirty to thirty-six months:	
Winter pasture, 4 months at \$1	4.00
Grain, 480 pounds at 60c per hundredweight	2.88
Hay, 1200 pounds at \$4 per ton	2.50
Credit for work done thirty-four to thirty-six months	\$77.88
Net cost of thirty-six months-old colt	\$67.88

*Prices of 60c per hundredweight for grain and \$4 per ton for hay were the prevailing prices during the winter of 1932-1933.

The net cost of raising geldings and fillies up to 36 months of age is \$67.88 not figuring interest. At this age the young horses are ready to do their share of ordinary farm work. In sections of Montana like the eastern part of the state, where winter grazing can be relied upon for a large part of the winter feed during the second and third winters and where summer grazing costs less, the cost of raising young horses would be considerably less. The main point to keep in mind is to feed the weanlings fairly well the first winter so that they will make a good growth from the time they are born until they are 12 months old. Then if they are turned onto good grass in their yearling form, they will keep on growing and will be ready to stand a few hardships during the second winter.

Purebreds

In case the rancher is raising a few purebreds and wishes to put more growth on the colts and fillies as yearlings and two-year-olds, they can be fed in open sheds much the same as the weanlings are fed during the winter months. They should be turned out on good pasture during the summer. The yearlings and two-year-olds should be handled in the same way as the weanlings except that they should receive more hay and grain. Stud colts should be fed a good growing ration at all times. They should be on pasture in the summer just as other colts. However, it is necessary to have the stud colts' pasture fenced with a good woven wire fencing with two or three strands of barbed wire at the top. The fence should be about five feet high.

Breaking

Horses are never too young to break. The younger they are the easier to handle and the less the danger of injury. Foals whose mothers' are being worked should be haltered and taught to stand tied before the mares are returned to work. It is a great convenience while working mares that the

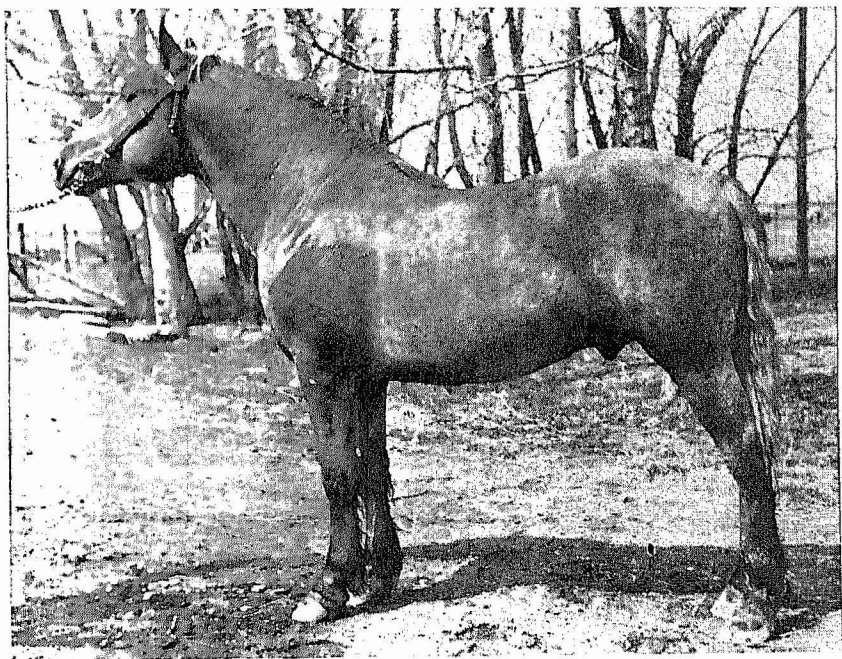


Fig. 10.—A well-grown two-year-old purebred Percheron stallion.
Weight 1600 lbs.

foals be taught to lead. This halter breaking of the foals is a good job for the 10 to 14-year-old boy. The boy will get most of the education, but the contacts are good for both boy and foals.

Three-year-olds should be broken to harness and will be able to do light work that year. Four-year-olds that were broken at three are hardened enough to do heavy work, but should receive good care. The four-year-olds are shedding their teeth; therefore, it is their bad year.

Range raised horses are a little more of a problem to break. The Horse Association of America, Chicago, Illinois, has published a bulletin by Harry D. Linn, which describes in detail different methods of breaking horses. Range horses that are halter broken at weaning time will be much easier to handle when grown.

FEEDING AND MANAGEMENT OF WORK HORSES

Feeding Idle Horses

Idle horses should be fed as cheaply as possible but kept in fair condition so that it will not take too much time and feed to get them ready for spring work.

Winter range and cheap roughages can be utilized economically for wintering horses. A good system in Montana is to turn the idle horses into a stubble field where there is a good stack of clean, bright straw adjacent to some winter pasture. The horses should have access to water and salt at all times. The corn stalk field is also an excellent source for cheap winter feed. Winter range should be used to its fullest extent when available and supplemented during bad weather with cheap roughages such as straw, corn stalks or hay. However, it should be kept in mind that in some years there is danger from forage poisoning when grazing corn stalks or combine stubble.

If the cheap roughages are of poor quality and do not keep the horses in good condition, it is desirable to give them some hay, enough at least to keep them thriving.

Preparing Horses for Spring Work

If the work horses have been wintered on cheap roughages and have run out all winter, some of them will probably be shaggy and only in fair condition when they are brought in for spring work, while others may be fairly fat and from all appearances ready for hard work. These horses even though fat are probably weak and should not be put at hard work immediately. Horses should be gaining in weight for a few weeks before spring work begins. They should be brought in and fed grain at least two weeks before starting them to work. Start feeding a small amount of grain at first and gradually increase the ration. It is important that the horses continue to get exercise daily. It is well to feed them so that they will readily shed

their winter coats, as this will help to keep the horse cooler when put into hard work. A small amount of bran or linseed meal aids in this respect.

Feeding Working Horses

The amount and kind of feed to be fed to work horses depends upon several factors:

1. Kind of feed available from the standpoint of palatability, digestibility, cost, effect of feed upon the animal, and balance of the nutrients.
2. Climatic conditions—Horses should be fed cooling feeds in hot weather and the heavier feeds during cold weather.
3. Amount of work—A horse should receive 2 to 2.5 pounds of grain and hay per 100 pounds live weight when doing medium to hard work.

Following is a guide for the feeding of work horses:

Type of work	Roughage	Grain
	Amounts per 100 pounds live weight	
Idle	$\frac{1}{2}$ lb. hay plus cheap roughage	
Light work	$1\frac{1}{4}$ lb. to $1\frac{1}{2}$ lb. hay	$\frac{1}{3}$ lb. to $\frac{3}{4}$ lb.
Medium work	1 lb. to $1\frac{1}{2}$ lb. hay	$\frac{3}{4}$ lb. to 1 lb.
Hard work	1 lb. hay	1 lb. to $1\frac{1}{4}$ lb.

All horses fed by this standard may not react the same since some horses are easier keepers than others. Another factor to consider is that the kind and quality of the hay fed will help determine the amount of grain to feed and vice versa.

Following is a guide that will help determine what constitutes light, medium and heavy work:

Light work	Average 2 to 3 hours work per day
Medium work	Average 4 to 6 hours work per day
Heavy work	Average 8 or more hours per day

A rule that can be followed for the division of the three daily feeds is as follows:

Morning	$\frac{1}{3}$ of the grain ration and $\frac{1}{4}$ of the hay
Noon	$\frac{1}{3}$ of the grain ration and $\frac{1}{4}$ of the hay
Night	$\frac{1}{3}$ of the grain ration and $\frac{1}{2}$ of the hay

Most of the hay should be fed at night when the horses have plenty of time to eat and digest the roughage.

Summer Care

In the summer time work horses should be turned out on good pasture if it is available. This keeps them in better condition and reduces the feed cost. When this practice is followed and the pasture is good, very little if any hay is needed, for morning and the night feeds of hay can be reduced. On Sundays and holidays the horses can be kept on pasture but should

receive one feed of grain. Home-grown feeds should be used as much as possible in order to keep down costs. Following are a few satisfactory rations for summer feeding:

- | | |
|---|--|
| 1. Oats with
very good hay
Pasture at night | 2. Oats 1 part
Barley 1 part
Timothy or wild hay
or alfalfa hay
Pasture at night |
| 3. Oats 3 parts
Wheat 1 part
Either timothy,
wild or alfalfa hay
Pasture at night | 4. Oats 1 part
Corn 1 part
Alfalfa hay or
timothy and clover
No pasture |
| *5. Oats 6 parts
Bran 2 parts
Barley 2 parts
Timothy and clover hay or
Timothy | |

Bran can be satisfactorily worked into all of the above rations if the cost is not prohibitive.

For winter feeding the same grain rations can be safely fed except it is well to feed safe legume hay or bran with the grains. It is also important to lighten the amount fed on Sundays and holidays and supplement with bran. The hay should be bright and not dusty in order to prevent heaves.

Saving Hay and Grain

On ranches where there are a number of extra work horses the procedure of working the horses two or three days a week and letting them run on pasture all of the time they are not working will save hay and grain. Horses handled in this manner do not need grain. Hay can be fed noons on the days they work. This plan works satisfactorily where there are a number of mature horses and also a number of colts that are being broken. Colts should have longer rest periods between the days they work than mature horses. An alternative for this plan is to work mature horses every day but only working them half a day at a time. The horses can be changed at noon. Colts should only be worked half a day every other day. By following these practices, on ranches where colts can be raised cheaply, the colts may be broken every season and as they mature, the older, better broken horses can be marketed. Thus the rancher realizes some revenue from the horses each year and still has enough horses available to do all of the ranch work.

*This ration is being fed satisfactorily to the college work horses at the present time.

Watering

Good clean water is needed by horses to aid digestion, to carry off waste products and to cool the body. Horses that are running out in pastures or when they are on winter feed, should have free access to water at all times.

The proper time to water work horses has always been a debatable subject. The common practice in America is to water, feed hay and then grain. The English method is to water, feed grain and then hay. The German method is to feed hay, water, and feed grain. As a matter of convenience, the American plan is best. Horses that have been running or working real hard and are hot should be cooled off for thirty minutes to one hour before they are watered or fed grain. Horses that have been "winded" should not be watered until they are breathing normally. A full drink of cold water when horses are over-heated may cause founder. An over feed of grain, especially corn, wheat or rye may also cause founder. A home remedy for founder is to stand the horses in a stream of water until the fever has been reduced. If given the opportunity, horses will go to a stream and stay in it of their own accord until they get relief.

Marketing Surplus Horses

Ranchers who have surplus horses for sale should fit them properly for market in order to realize the most for them. Many ranchers make the mistake of offering their horses for sale when they are thin and shaggy. Horses should show a considerable amount of condition to sell well. It is practically impossible to get horses too fat for the open market. The fat horse is heavier, more attractive and healthier when shipped. A dealer in Montana recently said, "Finish adds about \$25 to the selling price of a good horse on the average market." Another advantage that the finished horse has over the thin horse is that he ships much better. The fat horse fills up quicker after a long ship and stays in bloom while the thin horse more or less goes to pieces.

The market for horses is seasonal. Farm chunks usually sell best from January until early summer. This class of horses usually is of better quality and heavier than the southern chunks, which sell best from December to March. The large good quality draft horse will sell most readily in the late winter, spring and early summer, although at the present time the market seems to want a horse not to exceed 1600 pounds. The big plain horses that goes as a logger will sell best in the fall and early winter. This horse may be blemished some but must still be serviceable. A limited number of the lighter, more active horses that sell as delivery wagon horses sell most any season of the year.

At the present time (1933) the best selling horses are those weighing from 1300 to 1600 pounds five to eight years of age that are sound, well broken and of good type and color. These horses are meeting the farmer

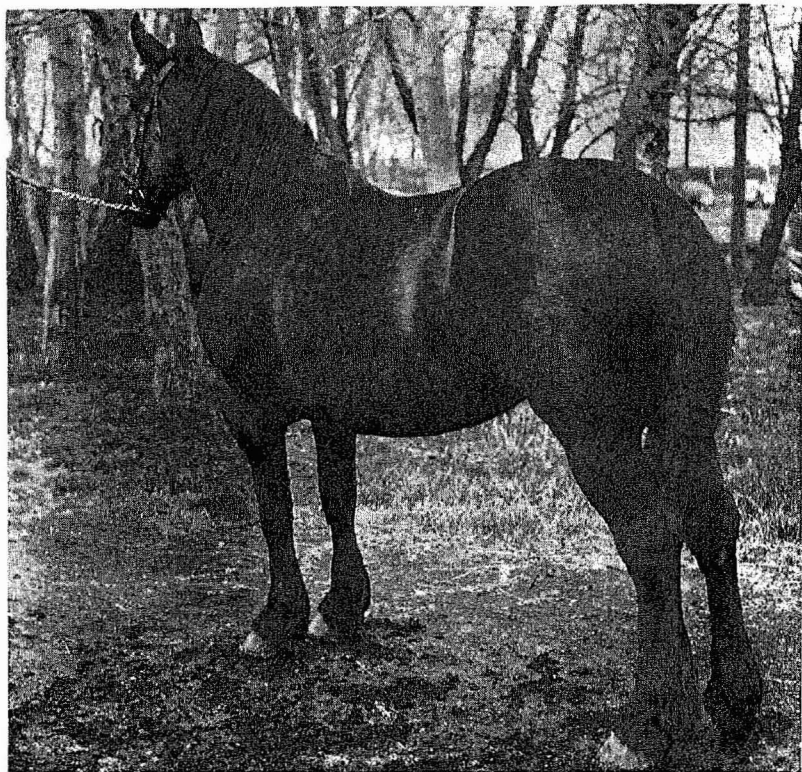


Fig. 11.—A 1550-lb., farm chunk mare of good type.

demand. A very limited number of the bigger horses find buyers at good figures. The reason for this is that there is an apparent shortage of suitable farm horses and there is not much activity in the lumber camps where the big ones are wanted.

The rancher or farmer should keep in mind the time of the year that the particular type of horses he has to offer sells best and fit them to sell at that time.

The factors that determine how well horses sell on the market are: (1) type, (2) conformation, (4) soundness, (5) weight, (6) age, (7) quality, (8) sex, (9) color, (10) training and disposition (11) style and (12) action. The breed to which the horse belongs is not very important as long as the horse is of the right type and conformation and is of good color. Solid colors are preferred.

Training is quite important. At the present time the good quality, well-broken, smooth-mouthed horses will outsell young horses of the same quality that are not very well broken. The buyers want them gentle. Fussy horses are a little hard to sell regardless of how good they are. However, the young horses that are gentle are always more saleable than smooth-mouthed horses.

At any of the central markets all horses that are sold as well-broken horses are hitched immediately after they have been sold. The buyer can watch them hitched, see how they work and test their wind. If they do not hitch well or have been misrepresented by the seller to the buyer in any way, the buyer has the privilege of rejecting the horse.

Horses from five to eight years of age sell best. The markets do not want immature horses. Three and four-year-olds do not sell well because lots of buyers feel that these young horses will not stand up under hard work like a five-year-old. This factor makes it possible for the Montana rancher to raise some foals each year and make this practice a very profitable enterprise. The young horses can be worked on the ranch from the time they are three or four until they are seven or eight and then they can be conditioned and sent to market. The rancher then has had three to four years work from the horses. Horses that are well broken will find a ready buyer at a top price if they are the right kind. Good Montana horses that are gentle are highly thought of by the eastern and middle west buyer because of their hardiness. Eight-year-old Montana raised horses are not considered old horses.

Soundness is very important. Good clean horses that are free of blemishes and unsoundness are always more saleable than horses that have even slight defects even though ability to work is not affected. Some of the most serious unsoundnesses are ring bone, bone spavin, bog spavins, side bones, cock ankles, curbs and thoroughpins. A horse that is "heavy" and has bad wind is hard to sell.

A matched team of geldings or a matched team of mares will always net more than two others of the same quality that are sold singly. A gelding and a mare are not considered a matched team no matter how near alike they are in size, quality, and color.

Fattening for Market

To fatten for market the horses should be placed in stalls and fed lightly for the first 10 days or two weeks after which the ration can be increased until they are on full feed. The stalls should be roomy, well-lighted and ventilated. The horses should not be exercised. They will stock some in their legs at first, but this stockiness will soon clear up and at the end of the fattening period they will be as clean as ever. Such feeds as barley, oats, bran, some linseed meal and either alfalfa, clover or timothy can be satis-

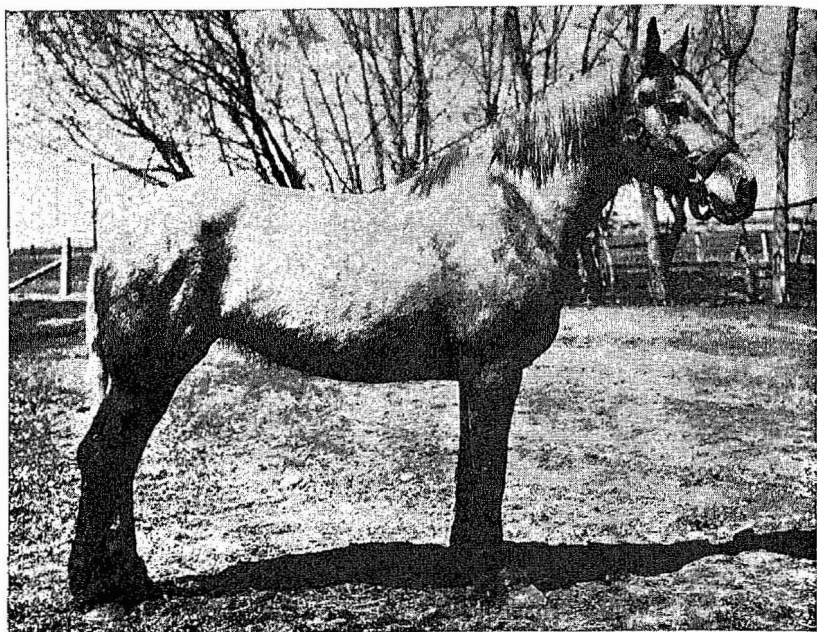


Fig. 12.—A good mare but too thin to sell—weight 1650.

factorily used. The main point to keep in mind is to feed a palatable fattening ration. Gains of from four to five pounds per day are not uncommon. In other words, the horses should make an average gain of 100 to 120 pounds per month. A week prior to the time the horses are to be shipped, the grain ration should be cut in two and they should be taken from the stall and exercised a little. They should be exercised daily from then on, gradually increasing the amount of exercise until they are shipped. It is important to cut the grain ration before exercise is started in order to prevent azoturia.

Fitting

Do not roach the mane or clip the fore top of the horses. Roached horses are not considered as fresh country horses on the central markets by the buyers. Buyers are afraid that these horses have been used in the city or in construction camps. They consider them as "secondhand" horses. Do no clipping on the legs. Keep the horses natural as far as mane, tail and legs are concerned, but have their hair in good condition and the mane laying on one side.

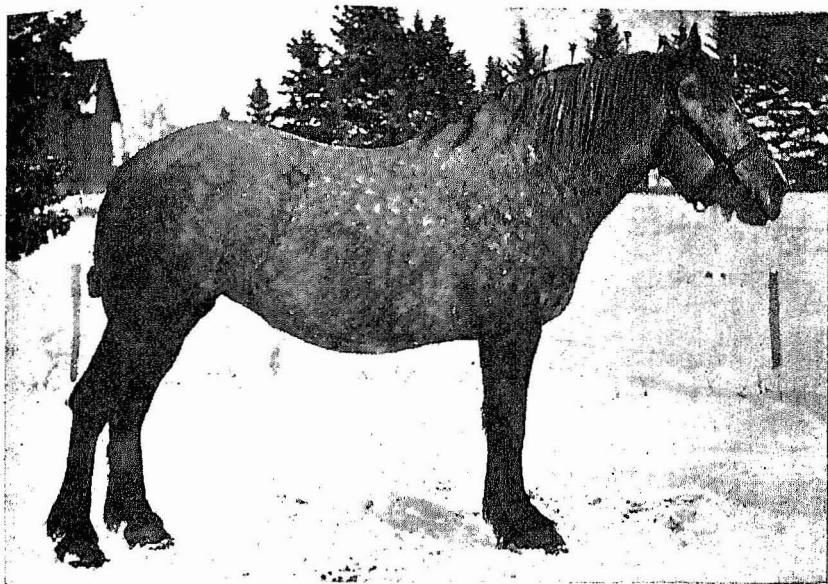


Fig. 13.—The same mare as shown in Fig. 12 a few months later—
weight 1950 lbs.

Shipping to Market

Horses should be loaded at the rate of about 28,000 pounds to the 36 foot car. In other words, 20 head of 1400 pound horses will ship nicely. The tonnage can be increased to 30,000 pounds when the horses are big, for instance, 19, 1600 pound horses can be shipped in one 36 foot car. According to one Montana shipper a 1500 pound horse in good condition will shrink about 50 pounds from Bozeman, Montana, to Chicago, figuring on the basis of his filled weight at Chicago. To ship well the first feed for the load of horses should be made within 24 to 26 hours from the time they are first loaded. This gives them a chance to fill and rest before they become too tired and gaunt. From then on they need not be unloaded and fed oftener than 32 to 36 hours.

Cost of Marketing

The cost of marketing at all central markets is about the same. Exclusive of freight, it costs about \$8 to sell a horse at the Chicago. This includes yardage at 35c, halter 40c, feed \$1 per day, insurance 15c, commission \$3 and shoeing \$3. With the freight rate around \$200 per car from Mon-

tana to the central markets and feed enroute around \$1 to \$1.50 per head, a Montana shipper figures it costs him between \$18 and \$20 per horse to ship and sell him on the middlewest markets.

Big Teams

Multiple hitches or big team hitches have been used in Montana and other northwestern states for a great many years. For a period during and after the war interest in these big hitches seemed to be very slight, but during the past few years there seems to be renewed enthusiasm for big teams. Big teams are especially well adapted for use in large fields for any implements used in preparation of the seed bed and planting, for summer fallowing, pulling combine harvesters, and for hauling big loads.

The advantages in using multiple hitches are:

1. A saving of man labor is effected.
2. Horses are more efficient because most of the side draft is eliminated. This also results in fewer sore shoulders and necks.
3. All horses are under complete control.
4. Horses can be kept cooler because there is less crowding.
5. Work done per animal is increased.
6. The load for each horse is equalized.
7. Two or more farm operations such as plowing and harrowing can be completed at the same time.

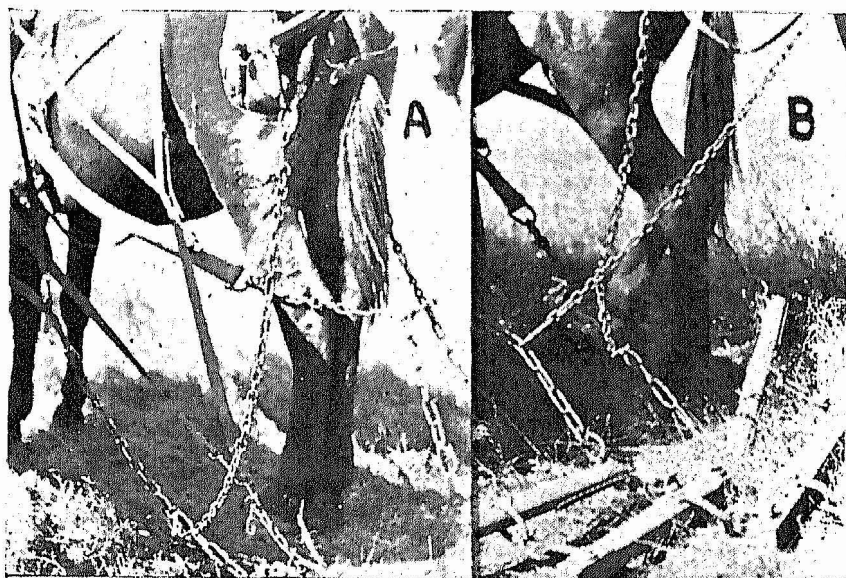


Fig. 14.—Tying-in—(A) the straight tie, (B) the cross tie.

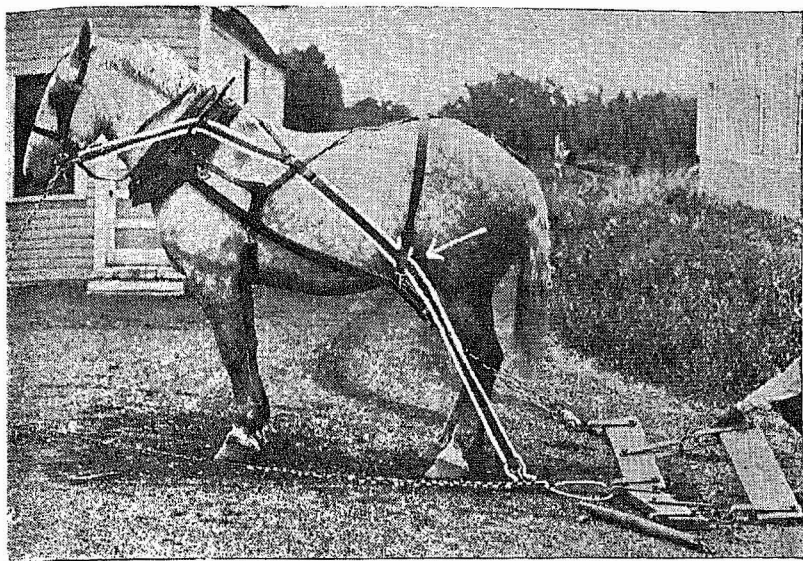


Fig. 15.—Bucking-back. Note that the buck strap passes through a leather sheath near the hip (arrow) so that it will not be stepped over when the team is being turned.

There are several different types of equalizers in use and they all have their merits. Two quite common hitches used in the northwest are the Schandoney and the Talkington hitches. The tying-in and bucking-back method is the most common system used for controlling the team. Figures 14 and 15 show how the tie-in chains and the buck strap are arranged. By using this system the driver controls his team with the lead team entirely, thus making it possible to drive most any number of horses by using only two lines. The buck straps are made on the same principal as lines. They are run through the hame rings and snapped in the bit. From the withers the single strap runs downward and is fastened to some part of the equalized hitch, usually the chain leading to the equalizers of the team in front. In this way when the leaders are stopped their equalizer slackens to the ground thus pulling back on each of the rear teams. The rear teams cannot start again until the leaders start, thus relieving the pull on the buck strap. By "tying-in" is meant the fastening of the halter lead chain to the singletree of the horse in front. This prevents the horse from loafing just as the buck strap prevents the horse from working too far ahead.

Extension Bulletin No. 70, "Big Teams in Montana," by M. L. Wilson, gives detailed instructions regarding various kinds of big hitches and their uses. This bulletin can be obtained from county extension agents or by writing to the Montana Extension Service, Montana State College, Bozeman, Montana.