Division of Agricultural Sciences
UNIVERSITY OF CALIFORNIA

Beef Handling and Feeding Equipment

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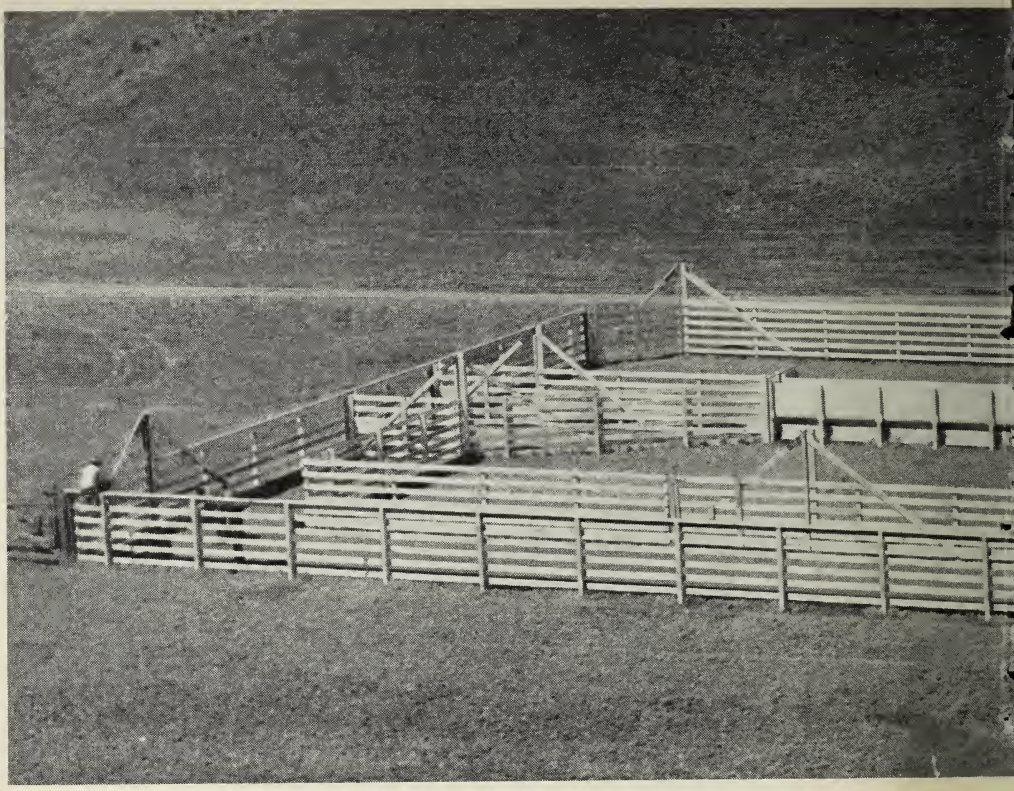
CALIFORNIA AGRICULTURAL
Experiment Station
Extension Service

CIRCULAR 414
REVISED



Here is a good corral for handling cattle. Its plan is shown on page 4. The corral is arranged in such a way that cattle can move toward the loading chute

Livestock damage from bruising and shrinkage can be prevented by careful handling and the use of proper equipment.

Good corrals and equipment should provide facilities for branding, dehorning, loading, unloading, weighing, dipping, parting, and working cattle. They should be built for convenience and laid out and planned for economy and serviceability.

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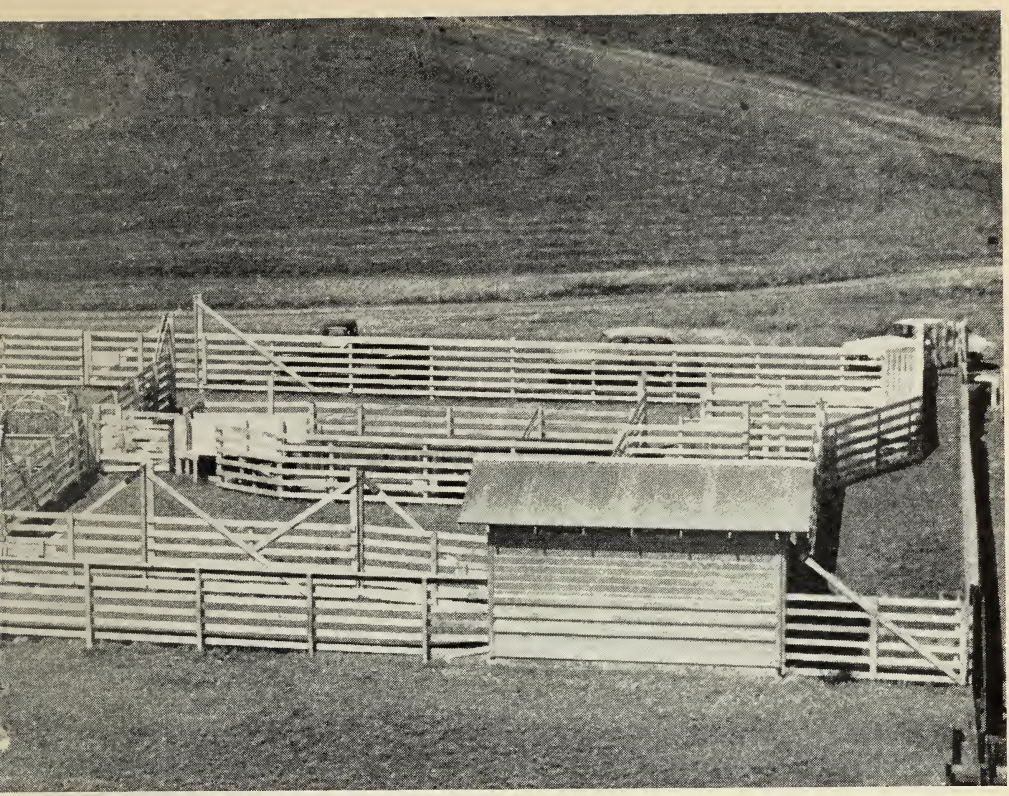


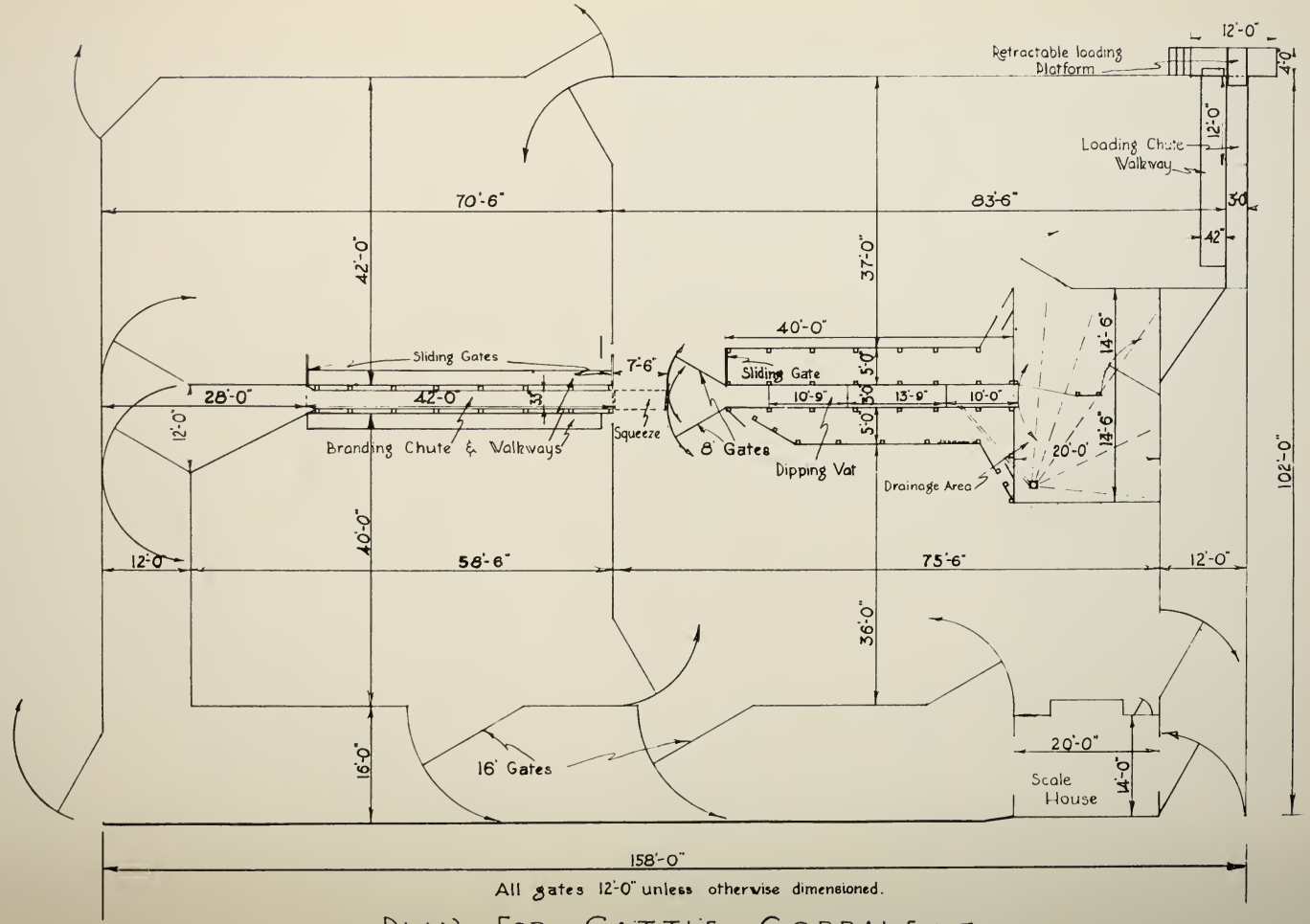
when being worked through the branding chute and dipping vat. Gates open to form "wings" with chutes; the scale is located out of the direct line of traffic.

This circular suggests plans for various types of handling and feeding equipment—corrals, loading chutes, scales, feedlots, and the like. There is no one plan to fit every need, but those given can be adapted by the individual stockman to suit his own requirements.

Estimated costs and materials for a feedlot corral and a work corral are also included.

Drawings were made by J. V. Galindo, draftsman in the Division of Agricultural Engineering, Davis.

The cover photo shows Ki Silacci, prominent cattleman of Salinas, California, on his top cow horse, with good practical working equipment for handling cattle.



All gates 12'-0" unless otherwise dimensioned.

PLAN FOR CATTLE CORRALS

Beef Handling and Feeding Equipment

REUBEN ALBAUGH C. F. KELLY H. L. BELTON

FOR WORKING CATTLE

When prices of cattle are favorable to the cattleman, he is wise to spend money in constructing or remodeling equipment for handling and feeding his stock.

Well-planned corrals and other devices make handling of stock easier, save labor, and, most important of all, cut shrinkage, bruising, and other damage to a minimum. Money spent on good handling equipment is one of the best investments a cattleman can make.

Of 163,444 head of cattle included in the National Bruise Survey, 10,414 were bruised. This amounted to 6.37 per cent, or a monetary loss of $5.71 per animal. The plans suggested in this circular have been developed to prevent bruising and shrinkage. However, careful handling is also necessary to avoid these losses.

There is no one plan for equipment such as corrals, scales, chutes, and dipping vats that would be best for all ranches. However, certain features and construction details of a general over-all plan might be usable on any ranch. A good, practical set of corrals and equipment should afford facilities for branding, dehorning, loading, unloading, weighing, dipping, parting, and working cattle. Drinking water should also be made available. In certain areas, shade and some weather shelters are desirable. Corrals and other equipment should be strongly built, and painted to preserve the material. They should not only be built for convenience, but also should be laid out and planned for economy and serviceability.

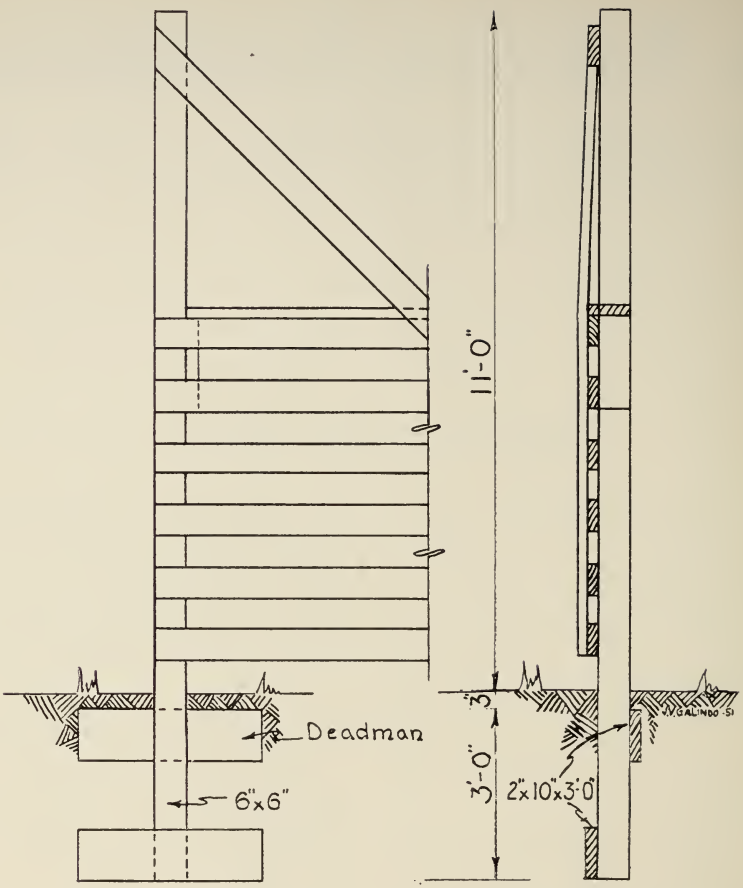
First build your holding corral

The corral should be in the center of ranch operations to reduce distance in movement of stock. If possible, choose a site that is on well-drained, sandy-textured soil.

One of the most important considerations is the loading chute. This must be so located that large trucks and trailers can easily reach it. After the location of the loading chute has been established, you can build the rest of the corral around it.

For fencing, 2″ x 6″ unsurfaced lumber is suggested. Double construction on the insides of corrals is recommended so that the outside of the posts will not damage and bruise the cattle. This also makes the corral stronger and more durable. The fence boards may be fastened in place with 20d nails, but ⅜″ or ½″ bolts are preferred. The fences should be 5½ to 6 feet high.

Posts for a 5-foot corral



Gate posts and deadmen should be made of redwood or other decay-resistant material. The top piece is nailed on outside of post, just below the ground surface; bottom pieces are on the inside, so that nails do not carry the pressure.

Use posts of redwood, cedar, or some other decay-resistant wood, set 6 feet apart, and at least 2½ feet in the ground. Set corner and gate posts 3 or 4 feet deep. Solid tamping of posts is one of the most important features in constructing corrals for cattle.

To preserve the posts, treat them with a 5 per cent solution of pentachlorophenol. This material is sold under various trade names, one of which is Permawood. Treatment costs about 5 cents per post.

It is a good idea to reinforce large gate posts with two 2″ x 10″ redwood pieces 3 feet long, as shown above, to act as "deadmen" below the ground. In addition to the deadmen, a 2″ x 6″ may be desirable to tie the tops of the gate posts together.

We do not recommend setting posts in concrete. They are more likely to rot, and if broken off, they are difficult to replace.

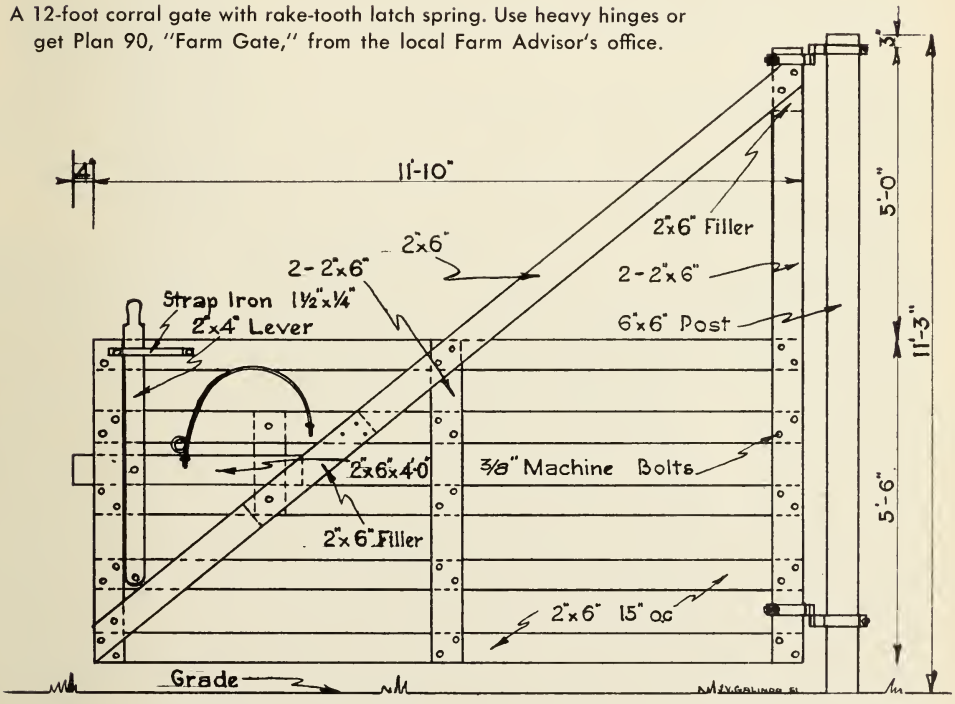
Gates are very important

There is an old saying that you cannot have too many good gates, and that the efficiency of any ranch is judged by the condition of its gates and the ease with which they operate. It is usually best to place gates in the corners of corrals or other convenient places where it is more or less natural for cattle to go. Wherever possible, the gates should open in the direction in which the cattle are being driven. If practical, gates should be swung so as to make a "wing" with chute corrals or scales into which the cattle are to be moved. Gates should be built of the same material as that of the corrals, and both bolts and nails should be used in their construction. Build the hinge end of the gate out of two 2" x 6"'s in order to give sufficient surface for the hinge.

Parting gates may or may not be placed in a chute. Some cowmen prefer to run cattle through a chute and part them with a two-way gate. Some may even want to make arrangements to cut them three ways. Our plan (page 4) calls for a parting gate at the end of the squeeze. It is so placed that cattle can be cut two ways. Other cattlemen prefer to part or sort their cattle in corrals, believing that it is easier on the cattle and causes less bruising and shrinkage.

Of the many different types of gates and latches, the one below has been found satisfactory on a number of ranches and is cheap and easy to make. A dump-rake tooth acts as a spring to keep the gate from being opened by the cattle.

A 12-foot corral gate with rake-tooth latch spring. Use heavy hinges or get Plan 90, "Farm Gate," from the local Farm Advisor's office.



Branding chutes

The cattle-branding chute shown on opposite page is more or less a dual-purpose chute. Used for branding, spraying, or parting cattle, it is so constructed that both small and large cattle can be worked through the same chute without having the smaller animals turn around and the larger ones become lodged in it.

Sides are solid. The chute is 17 inches wide to a height of 2 feet, above which it widens to 33 inches (see detail, p. 10). For economical construction, five 2″ x 6″'s alternating with 1″ x 6″'s may be used above the 2-foot level. The floor should be concrete, with a broomed finish.

Brace the chutes by nailing 2″ x 10″'s in the ground 6 inches below the bottom of the chute from post to post. It is not desirable to brace the posts by nailing cross ties across the top. This construction interferes with operations such as spraying. Details for constructing these cross ties at the bottoms of the posts are shown in the plan on page 10, with an alternate method, using a concrete cross beam, detailed directly below it.

An adjustable chute has been developed by Julius Trescony of San Lucas. One side is a solid, vertical fence or wall 5 feet high, bolted to preservative-treated posts set 3 feet in the ground. The other side moves in and out on wheels so that the width can be varied from 16 to 31 inches—narrow enough for a calf, wide enough for the largest animal. Three wheels, 10 inches in diameter, will support the movable side of a chute 30 feet long. The side is forced back and forth by two large, horizontal screws at each end of the chute. One of the screws has a hand crank. A chain running over sprockets makes it possible to turn both

One side of chute shown below moves in and out on 10-inch wheels. Side is locked into position by notched arm. Detail at right shows hand crank, chain, and sprocket for adjusting movable side

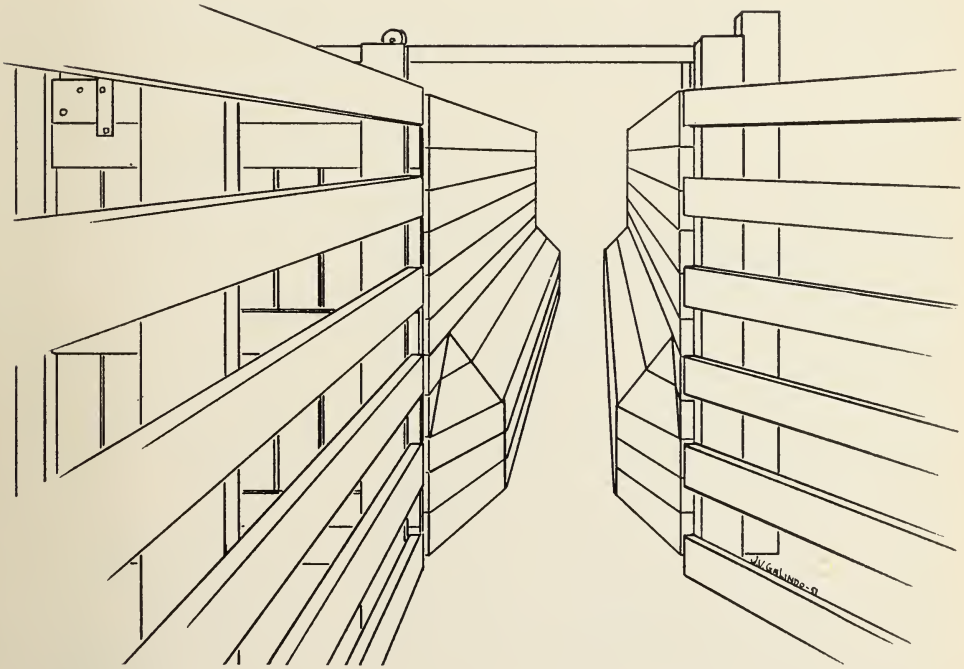
screws at each end by one crank (see photo, p. 8). The movable side is locked in position (after it has been moved to the correct width by means of the cranks) by a notched arm which temporarily, but solidly, connects the side to heavy posts set in the ground (see photo, p. 8). If you wish to build this type of chute, see Plan 95, page 19.

Walk-ways are desirable on any kind of chute. Sliding gates should be constructed at either end of the branding chute by crossing 1″ x 6″'s and nailing them well. Detail for this construction is also shown in the sketch on page 10.

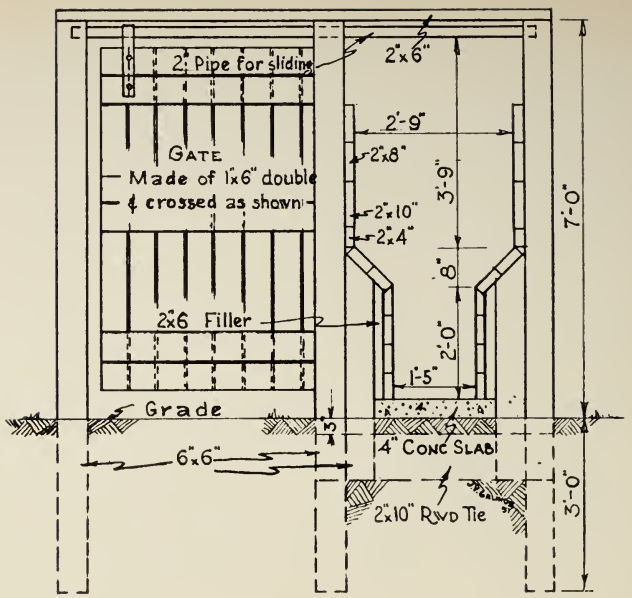
Some cattlemen like to build curved chutes, thinking the cattle will enter them more readily. This type is more difficult to construct and is not so convenient to incorporate in the general corral plan. Most cattle chutes are straight. Cattle usually want to return to the area from which they came, therefore chutes located so that the animals can be driven into them in that direction are desirable. A hoist for raising cattle which may go down in the chute is shown on page 11.

The cattle squeeze is highly important. Here most of the work of branding and dehorning is done. Many types are available. Probably the best and most economical over a period of years are commercial squeezes that can be bought on the market. Ranchers who want to make their own squeeze chute can follow Plan 5465. (See p. 19 for list of plans.)

A calf-branding table can be purchased or it may be built from specifications in Plan 201. If such a table is used, it can be placed at the end of the squeeze; or the squeeze can be removed and the calf table placed at the end of the chute.

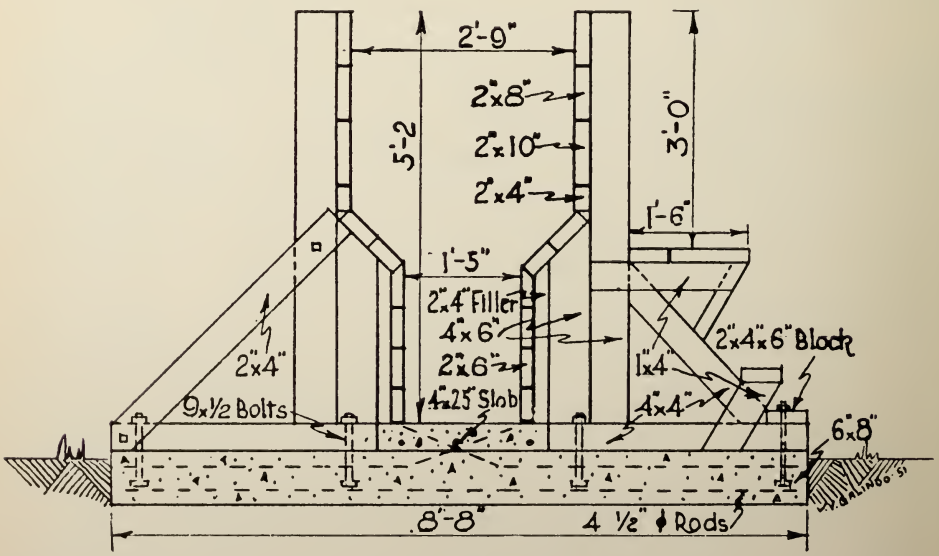


Branding chute, looking down the entrance end. Note flared ends near the bottom to guide cattle into the chute and prevent bruising. A squeeze can be set up at the far end.

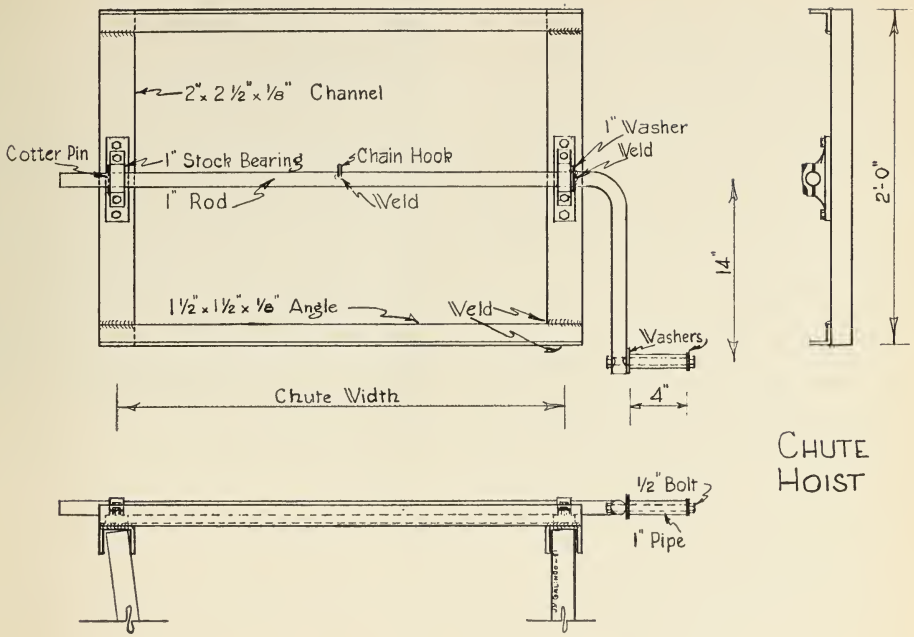


Construction details of the chute shown on page 9. Treat bottoms of posts with preservative; give concrete floor a rough finish.

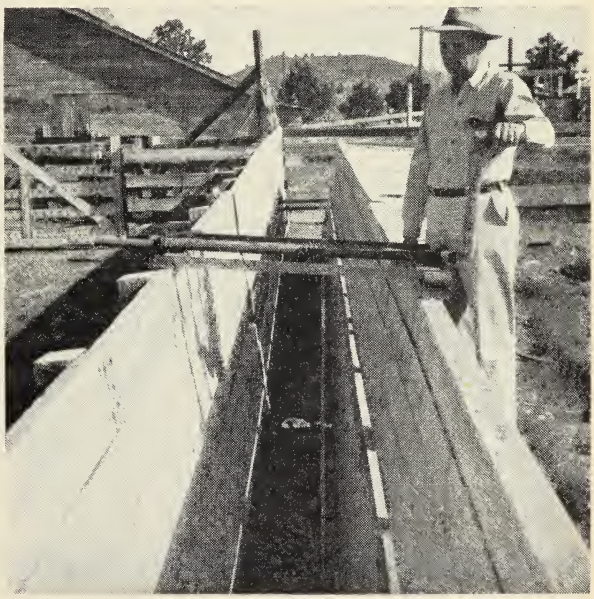
An alternate method of making a chute on rocky soil. Chute is kept in place by weight of the concrete sleepers placed every 6 feet. Detail of man walk is also shown.



Making a portable hoist



Plan for making a portable hoist for raising cattle that go down in the chute. The distance between the channels should be the same as the width of the chute.



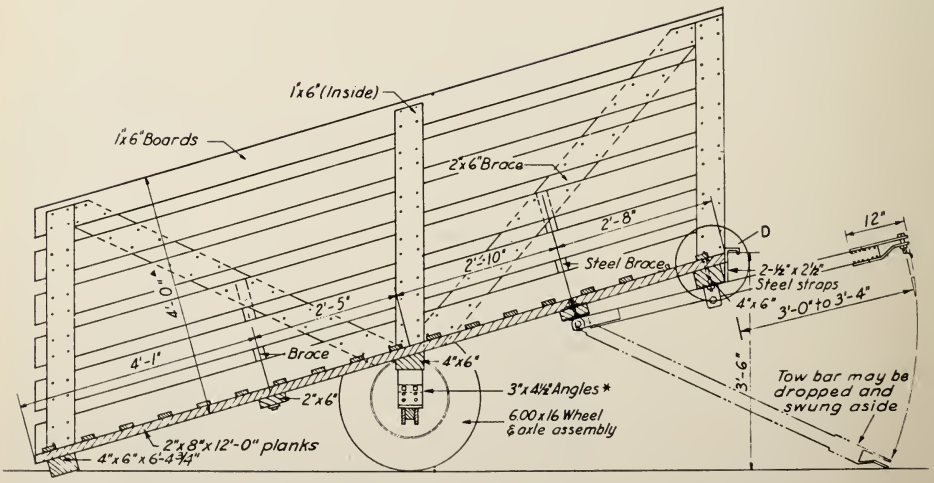
The portable hoist, for which plan is shown above.

A portable loading chute

Since most cattle are transported by truck, it may be necessary, on many ranches, to have a portable loading chute. Such a chute is convenient because it can be hauled from field to field and can be used for loading and unloading in temporary corrals, such as in beet fields and irrigated pastures.

The portable loading chute shown in the photo here can easily be hauled behind a truck or trailer and can be operated by one man. It is mounted on retractable rubber-tired wheels.

A well-designed portable loading chute.



Plan for a portable loading chute that may be towed behind a truck.

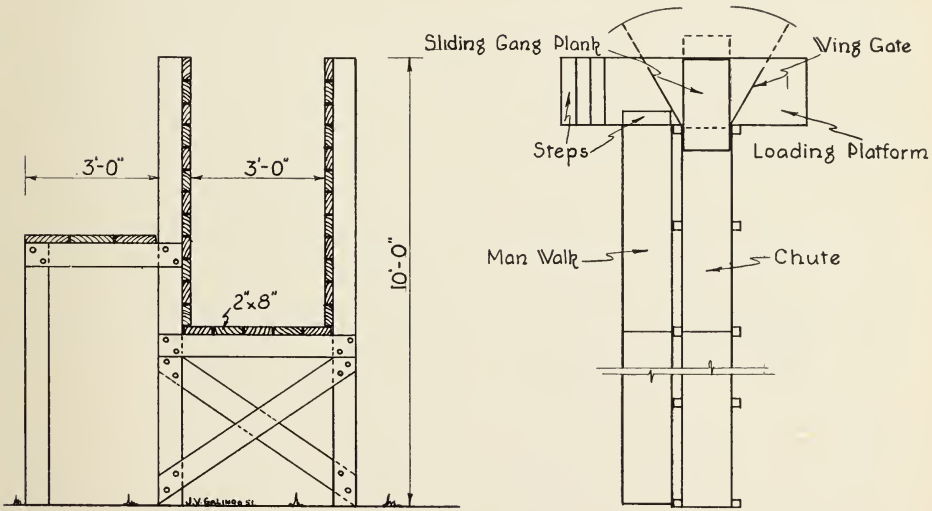
Loading chute with sliding gangplank

Locate your loading chute so that both large and small trucks and trailers can reach it conveniently at any time of year. Pages 14 and 15 show a plan for a strong, well-constructed loading chute with 16-inch gangplank movement. A desirable feature of this plan, for adjusting the end of the chute that comes into contact with the truck, is shown in detail on page 12. It is also important, for easy loading, to have the loading chute long enough so that there is a gradual incline from the corral to the trucks.

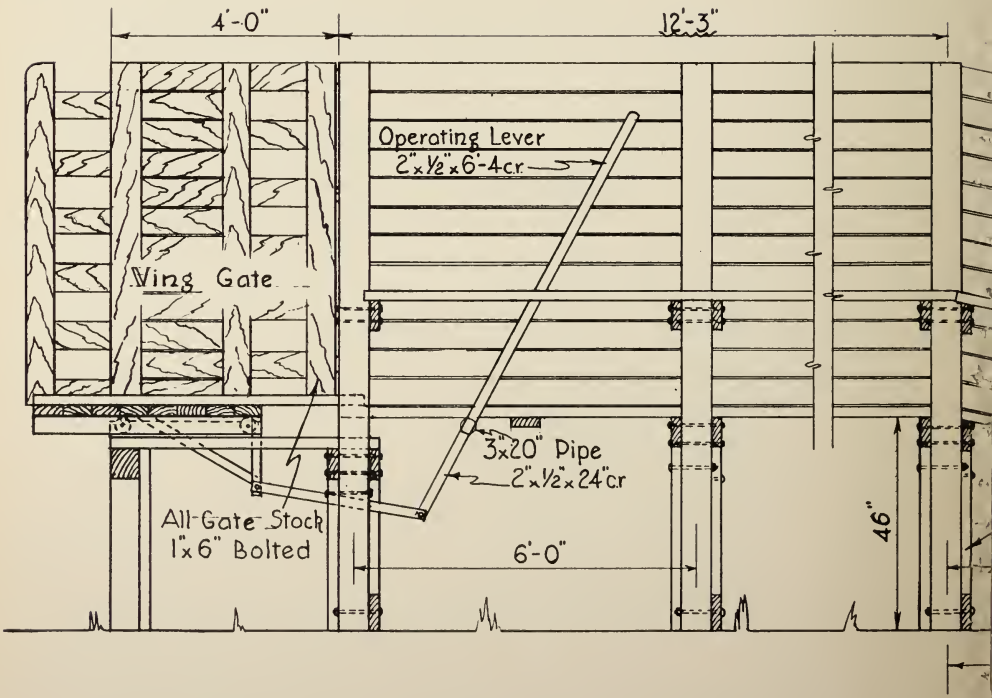
Reinforce the loading chute by tying the posts at the bottom rather than at the top. The width should be 3 feet in the clear. Construct walk-ways on both sides of the chute. If they are put on one side only, the left side is the more convenient. Where corrals and equipment are constructed on land that is rather stony, in which setting posts is difficult, chutes can be successfully built on top of the ground by the method illustrated on page 10. Concrete sleepers placed every 6 feet will keep these chutes in place.

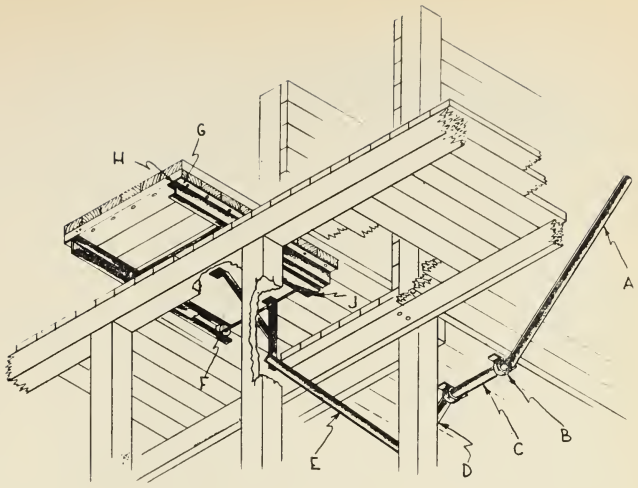
Stepped-ramp loading chutes are becoming popular in stockyards, replacing the sloping ramps. Some cattlemen believe such chutes are safer than the ramps. They require a little less space to install. A run of not less than 18 inches and risers of not more than 4 inches have been found to be the correct proportions for the steps.

Details of man walk for loading chute on pages 14 and 15.



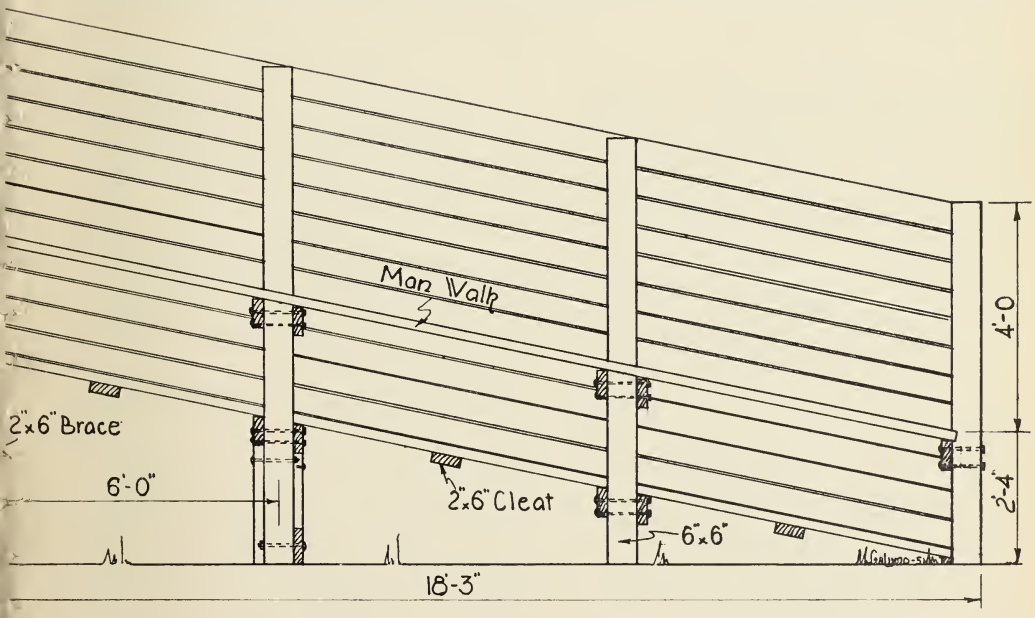
Stepped-ramp loading chute. Steps should be at least 18 inches wide, not over 4 inches high.





Lever A, welded to 2" shaft C which turns in bearings B, moves gangplank back and forth on rollers F through linkage of pieces D and E. Rollers F, 2½" in diameter, turn on shafts that are supported by angle J, 4" x 4" x ¼". This angle is bolted securely to the wooden platform. The roller tracks H are of 3" x 1½" x 1½" x ¼" channels welded to the steel pieces G (¼" x 3" x 4'–0" cold rolled steel). These pieces are bolted to the moving platform. To simplify the detail, wing gates are omitted in the drawing.

Construction details of loading chute. For details of man walk, see plans at bottom of page 13.



This scale house was built over the scale and rack. One disadvantage of such a house is that the scale rack cannot be removed for weighing trucks or other large equipment.

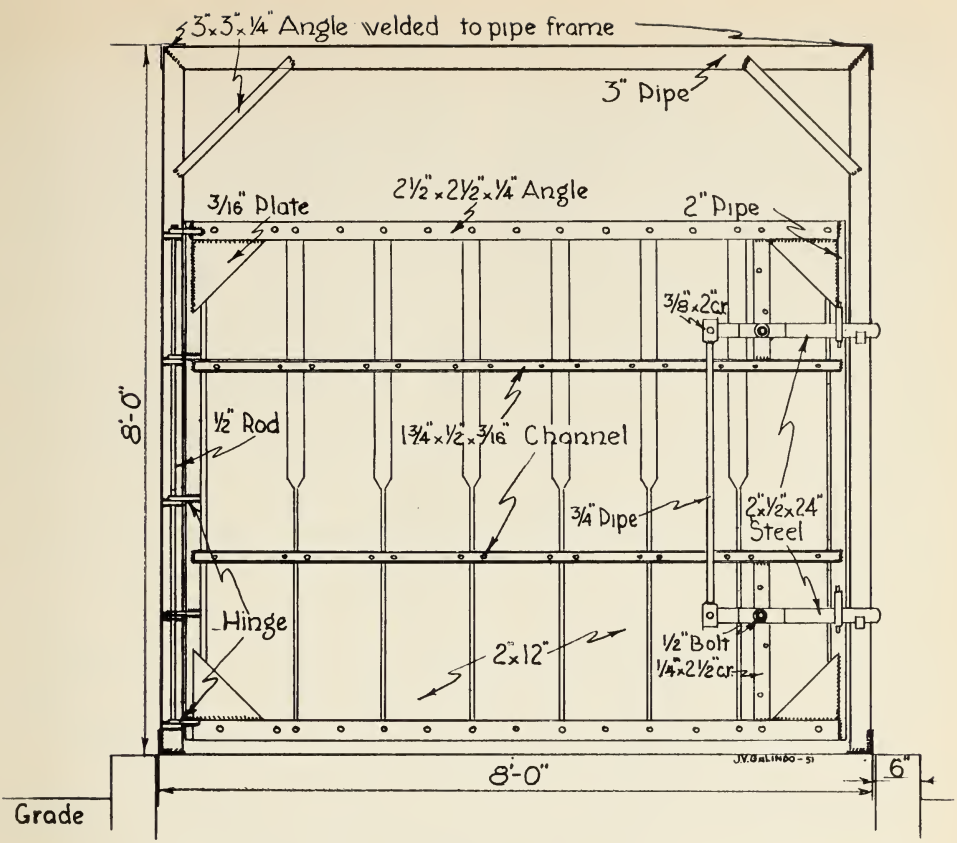
Scales are important and need good care

Scales are one of the most important pieces of equipment in the cattle business, and too much stress cannot be placed upon their proper care, treatment, and location. It is very desirable to have them located so that cattle can be worked in the adjoining corrals without passing over the scales. The only time cattle should cross the scales is when the animals are being weighed.

Scales should be of the pit type, and the pit should be built of concrete. Make the pen slightly smaller than the scale platform so that it rests entirely upon it—in other words, the pen becomes part of the weighing platform. Where this is not the case, accurate weighing is impossible.

On some ranches it is desirable to remove the scale rack from the scale platform in order to weigh hay or grain on a truck or wagon. This can be accomplished by placing the scale rack on a small track so that it can be removed when necessary. In this case the scale house or shelter must be high enough to provide clearance for the loaded vehicles. If you do not wish to remove the scale rack, bolt it solidly to the platform. The type of construction recommended for the scale rack is similar to that of a rack on a cattle truck.

Scales work more satisfactorily if they have some kind of housing or shelter over them (see above). Such housing should be large enough for working space around the scales. The latch for the scale gate recommended here has been found workable and practical. Detail of a rack incorporating this latch is shown on opposite page.



Scale rack and gate details. The 3" x 3" x 4¼" angles are welded or bolted to the scale bed, and the 3" pipe rack frame is welded to the angles. The double latch insures rigidity.

A branding-iron stove

The branding iron stove shown at right is easy to make and inexpensive to operate. It was developed by Julius Trescony, a cattleman of San Lucas, Monterey County, California.

The stove is made from an oil drum with one end left open. Use an acetylene torch to cut a 12" x 12" opening in the middle of the drum, on one side. Do not cut away the lower part of the drum as it serves to support the branding iron.

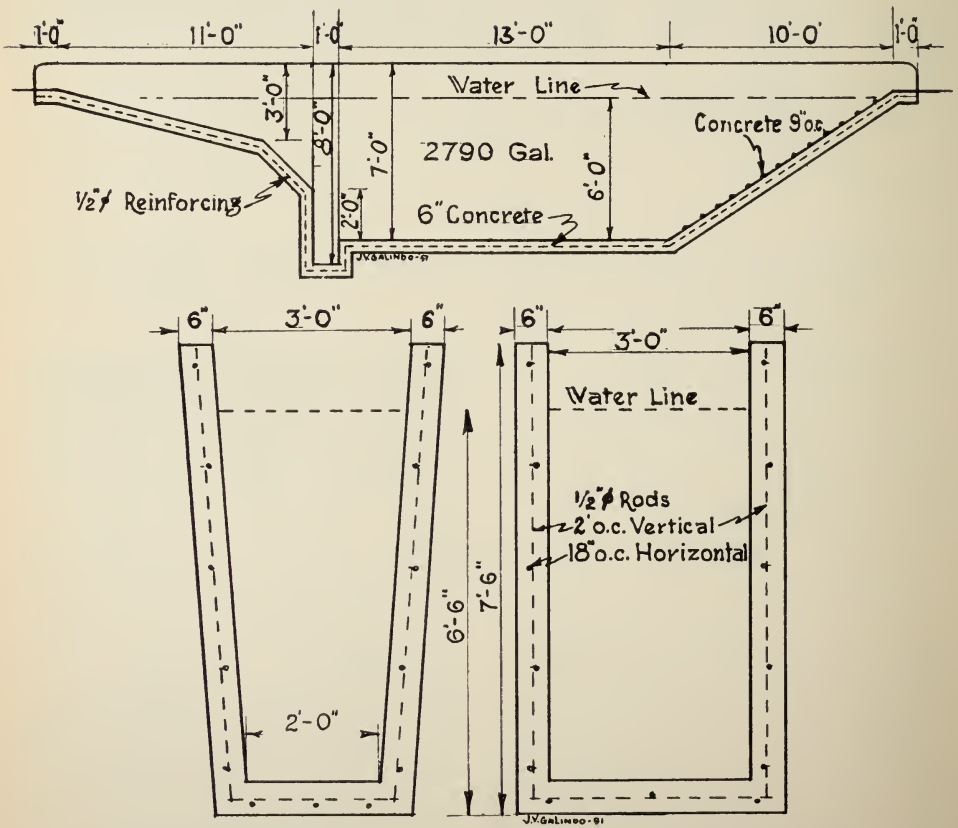
When the irons are to be heated, a wood fire is built in the bottom of the drum. Branding irons are inserted in the opening. Such a stove heats the irons quickly and evenly and at the same time reduces the fire hazard.

A dipping vat may be necessary

On some cattle ranches dipping vats may be needed to control external parasites, especially lice and ticks. The plan shown on this page features a wade-in, which conserves dipping material and makes it easier to drive cattle into the dip. If the wade-in is eliminated, a 30-foot vat is large enough for most ranches, although it can be made larger if necessary. The plan shows longitudinal and alternate cross sections of a concrete dipping vat. The sloping-side type will save a little liquid.

The concrete mixture recommended is 1 sack of cement to 2¼ cu. ft. of sand and 3 cu. ft. of gravel. To insure waterproof concrete, use a minimum amount of water—not more than 5 gallons per sack of cement for this mix, if the sand is moist. (For more detailed information on waterproof concrete to be used in construction, write the Portland Cement Information Bureau, 564 Market St., San Francisco.)

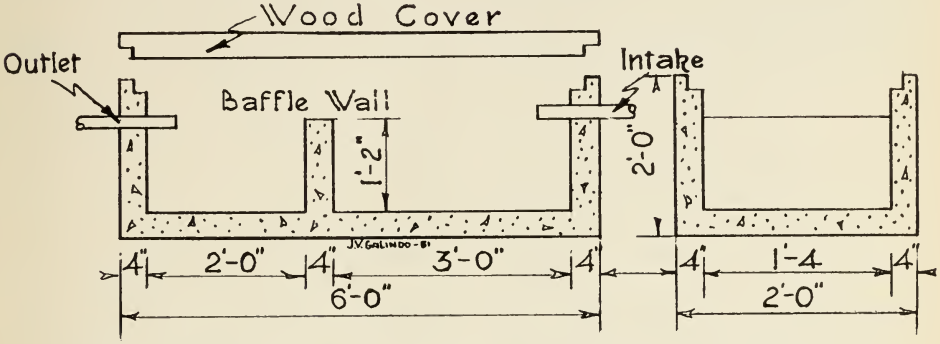
A waterproofing paint may also be applied to the vat after it has been constructed. One-half-inch steel rods placed 18″ on centers horizontally and 24″ vertically are recommended for reinforcing the concrete. Approximately 10 cu. yd. of ready-mix concrete will be needed or, if the mixing is done on the job, 60 sacks of cement, 7 cu. yd. of sand, and 8 cu. yd. of gravel (largest



Longitudinal and alternate cross sections of a concrete dipping vat. The sloping-side type (left) will save a little liquid.

size 1½-inch). A total of 525 pounds of the ½-inch reinforcing steel will be necessary.

In constructing the vat, pour the walls first and the bottom as soon after as possible. The drain corral in connection with the dipping vat is arranged so that unused liquid is returned to the main vat. The catch basin shown on page 19 may be constructed in the line between the drain corral and dipping vat. The basin keeps the dip clean by removing debris, and helps prevent waste. It should be installed in the return line from the drain floor to the dipping vat. The lumber used in making forms for the vat can later be used as fencing material for the corrals.



A catch or settling basin for removing debris from the dip. This may be installed in the return line from the drain floor to the dipping vat.

YOUR UNIVERSITY OF CALIFORNIA FARM ADVISOR CAN SUPPLY THE FOLLOWING CORRAL AND STRUCTURE PLANS

or order from Agricultural Publications, 22 Giannini Hall, University of California, Berkeley 4, California

Plan No.		Price
17	Ring latch for gates. Closes automatically; opens easily	.10
90	Gate, 16′ wide, 4′ high. Wood. Diagonal brace to hang gate from post 7′ high. Details of hinge	.25
95	Adjustable-width cattle-branding chute	.25
107	Step-type cattle loading chute	.50
111	Cattle guard. Wood, wood and concrete, or concrete and steel construction. Will support 5-ton truck	.15
148	Cattle stocks—animal is held by wooden neck stock and canvas sling wound up on side rollers	.25
174	Cattle holding chute, 24 ft. Crowding pen, stanchion gate, and parting gate. (*Not a squeeze, see 5465*)	.50
184	Cattle dipping vat—slightly larger than the plan shown on page 18. Detail of parting gate and drain pens included	.15
201	Nevada calf table and squeeze—a combination squeeze-operating table. Table tips to horizontal position. Wood construction	.25
5465	Nevada dehorning chute—a heavy, rugged squeeze, using 8″ x 8″ posts for the frame and 2″ pipe for both sides of squeeze. Adjustable head stock	.25
5681	Movable chute for loading cattle	.15

ESTIMATED COSTS FOR CORRAL PLANS APPEAR ON PAGE 41

FOR FEEDING CATTLE

Keep these factors in mind: (1) labor efficiency, (2) good drainage, (3) protection of feed from weather, and (4) protection of animals from weather.

The labor cost of feeding cattle is second only to the cost of feed. In the feed corral, arrangements must be made to get the feed to the animals and haul away the manure with a minimum of labor. Gates and the yards themselves should be large enough so that you can operate mechanical equipment for cleaning.

If feed mangers are located along the sides of the corrals they can be filled from the outside, without your entering the yard. Otherwise, stationary or portable bunks may be arranged inside the yard. In either case, access to the bunks by trucks or teams must be maintained in all weather. A concrete slab about 12 feet wide may be constructed the full length of feeding mangers. This structure keeps cattle out of mud and facilitates cleaning.

Whenever possible, the feed yard should be placed on a slope with natural drainage away from the lot. If this is not feasible, construct mounds of dirt in corrals away from the feed bunks. This will afford a place for cattle to lie down. If there is a choice, the yard should be run across the slope of a hill so that the feed road and mangers will be on the high side. Also, the shorter the distance in the direction of the slope, the better the drainage.

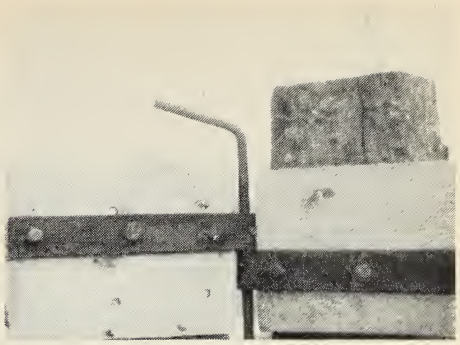
Although pavement is expensive, in some cases it may pay to have a strip of concrete 10 or 12 feet wide along the feed mangers. Harvey McDougal, feeder at Collinsville, California, has found that redwood 2″ x 4″'s placed on edge, and extending back from the manger 20 feet, will keep the cattle out of the mud and serve as a place for them to lie down when the feed lot is very muddy. The 2″ x 4″'s should have a slope of 1 foot in 10 feet, away from the mangers. In cleaning this type of manger apron, attach a piece of rubber belting to the bulldozer blade to protect the 2″ x 4″'s. "Blacktop" paving will not stand up for long under continuous use by cattle, but it makes a suitable road for the feed trucks.

Allow about 220 sq. ft. of corral space per animal unit. One hundred fifty head is about the maximum number of cattle that can be successfully fed in one lot. Smaller numbers per lot are often more desirable. Cattle should be sorted for feeding on the basis of grade, size, sex, and whether horned or dehorned.

General view of a feed yard. Mounds of earth in the yard would provide dry places for cattle to lie down.

A good gate hinge

The gate hinge shown here is simple and economical. It is made from the ends of two automobile springs. A 3/8-inch iron rod passes through the holes in the springs to make the gate secure. Because the metal of the springs is very hard, holes cannot be drilled in it without first reducing the temper. It is therefore necessary to heat the metal and allow it to cool slowly before drilling.

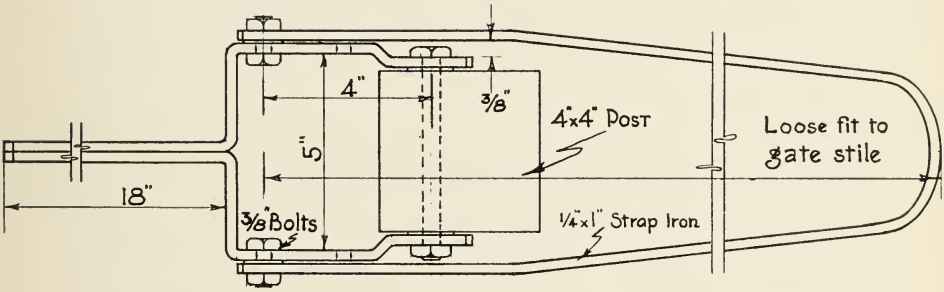


Make strong fences

The fence for a feeding corral can be either wood or wire. It should be at least 5½ feet high with the posts set 8 feet apart. Suitable lumber for corrals is 2″ x 6″ spaced about 6 inches apart. These boards can be either nailed or bolted to the posts.

Woven wire or cable fences are cooler than wooden board fences in hot climates. Boards slow down air motion and reflect solar heat back on to the cattle. Studies in the Imperial Valley indicated animals in a woven wire corral surrounded by green alfalfa gained 0.4 lb. more daily than did animals in a conventional wooden corral.

A simple gate fastener



This gate fastener, for which a drawing is shown above, is simple to make and is very effective when used on wire gates.

Feed mangers and feed bunks

The requirements of a good feed bunk for beef cattle are strength, tightness, and correct shape and proportions. Where the animals have access to only one side of a manger, allow about 2½ feet for dehorned animals, 3½ for horned animals, and about 2 feet for calves.

A good type of manger for feeding hay along the side of the lot is shown on this page. It is supported on the corral posts spaced 6 feet apart and the front or side next to the animals is made of three 2″ x 8″'s. No bottom is used. The feed rests on the ground, or on concrete if the lot is paved. The height of the guard rail, to keep the cattle out of the manger, should be made adjustable from 1′ 6″ to 3′ 0″ above the manger front by means of holes in the line posts, to allow for growth of the animals.

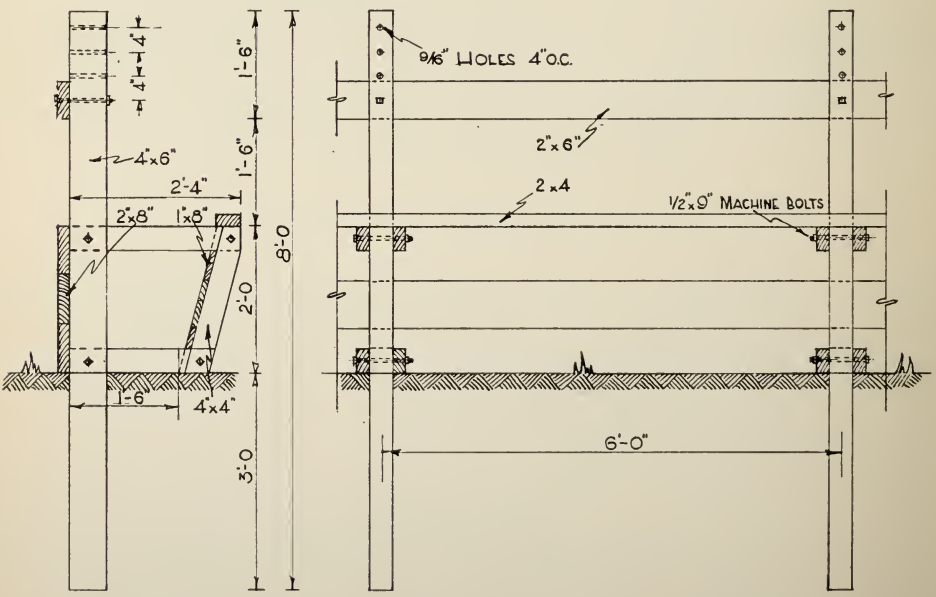
A manger of the same general type appears at the top of page 23, but with an added backboard that keeps feed from being thrown forward. The guard rail is replaced by a ½-inch steel cable running through holes in the line posts.

If log rails are available, they can be used for a manger as shown at bottom of page 23. The poles should be peeled. If they are flattened on the side next to the line, posts can be nailed in place with 60d spikes, or held with a wrapping of heavy, smooth wire.

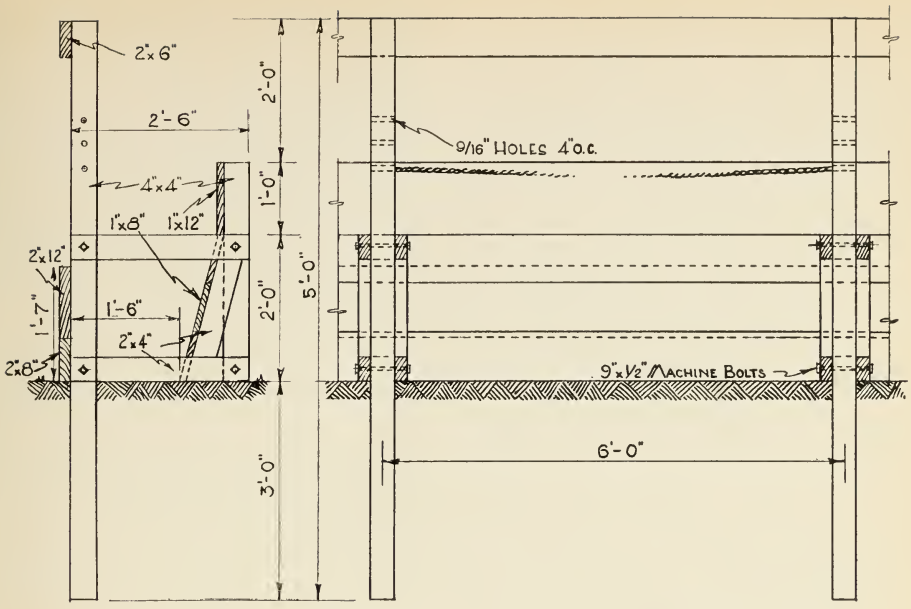
A type of manger well suited for mechanical feeding of mixed chopped feed from a truck with auger is shown at the top of page 24. The bottom of the manger is made of sheets of galvanized metal 36″ wide and as long as can be obtained. There are no obstructions to the free passage of the truck auger, and the bottom is smooth and easily kept clean. Fasten the sheets to the wooden rails with large-headed roofing nails.

A satisfactory kind of manger for barn feeding of concentrates to young stock is also shown. The backboard keeps feed from being thrown forward. The ½-inch cable can be replaced by a 2″ x 6″ if desired (bottom figure, p. 24).

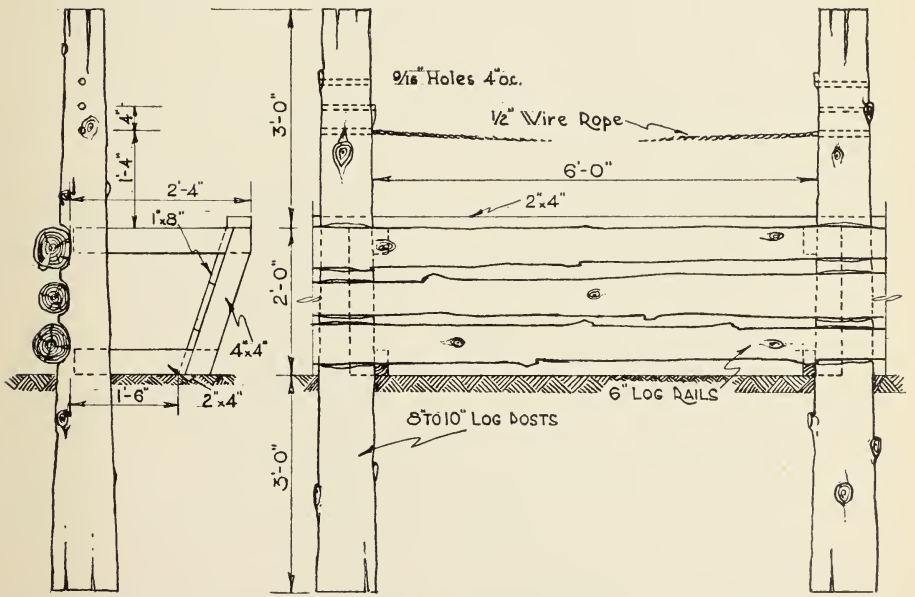
Concrete makes an ideal manger be-



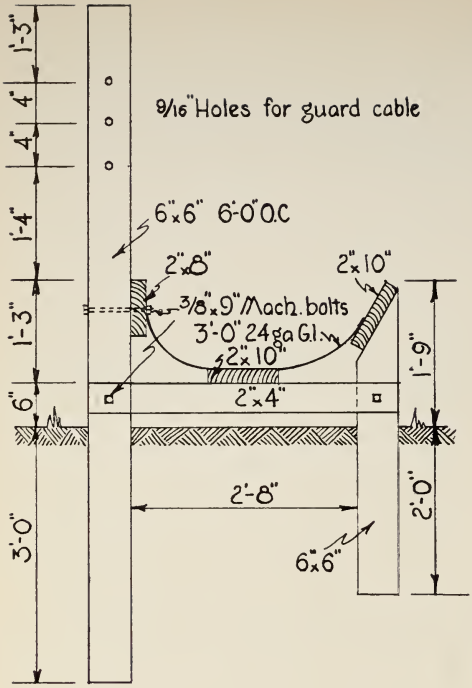
This manger may be attached to the outside of the feed yard, and has an adjustable guard rail.



A manger for use in a feed yard; includes a backboard to prevent waste of feed, and a guard of ½" cable.



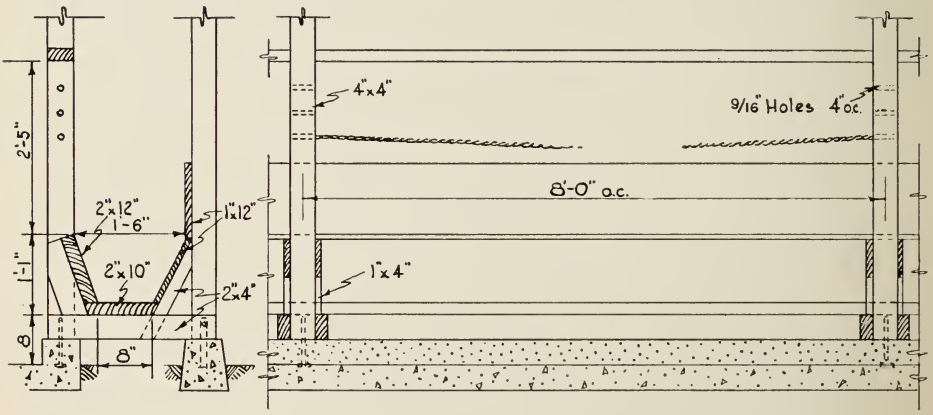
A hay manger that may be constructed against a corral of peeled logs and poles.



cause it is durable and easy to keep clean. In some areas, prefabricated concrete mangers are available in 8-foot lengths at a cost of approximately $2 per lineal foot. Mangers can also be constructed of concrete masonry blocks. A plan (No. 226) showing construction details for eight different types of mangers (several of concrete) and four types of feeding floors may be obtained from your Farm Advisor (or see p. 35).

A manger with galvanized iron bottom for use with mixed feeds.

Below: a manger that is suitable for feeding concentrates in a shed or barn.



Portable feed bunks and racks

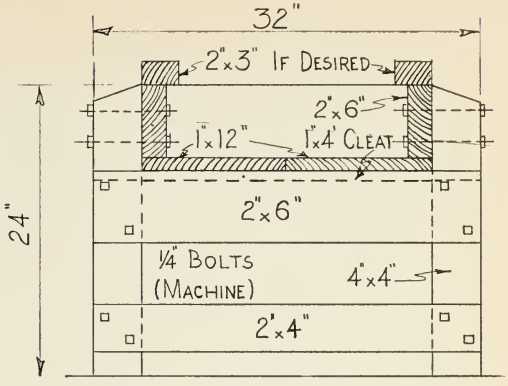
Plenty of weight and width are necessary for a portable bunk used for feeding silage and concentrates in the corral, to prevent tipping. Such a bunk is also desirable for feeding concentrates on the range or on irrigated pastures. It can be moved by lifting with a fork lift on the front of a tractor, or 4″ x 4″ skids can be attached to the legs.

A portable rack for feeding hay in the corral or pasture is also shown. When filled, it has a capacity of 300 cubic feet, or about ⅔ ton of long hay—enough to last 12 animals three or four days if fed at the rate of 30 pounds per head per day.

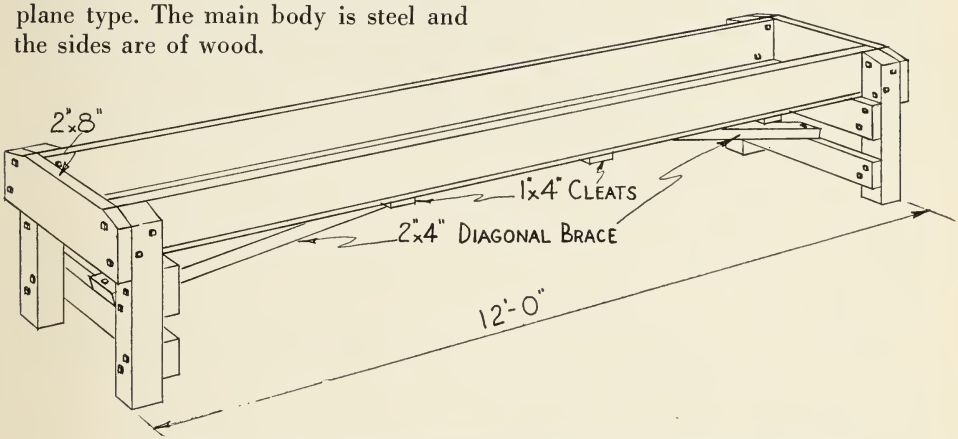
A successful trailer for hauling feed is shown in the photos on page 29. It

was perfected by Stanley Cahoon of the Major Distributing Company of Soledad, California. It is 16 feet long, 8 feet wide, and 4 feet high, with a capacity of 3½ tons of green chopped material. A 3-foot canvas is placed around the top to keep the hay from being scattered by the wind. An ordinary Fox field chopper is used to pick up the hay, chop it, and blow it into the trailer. Trailer and chopper are pulled by a Farmall tractor.

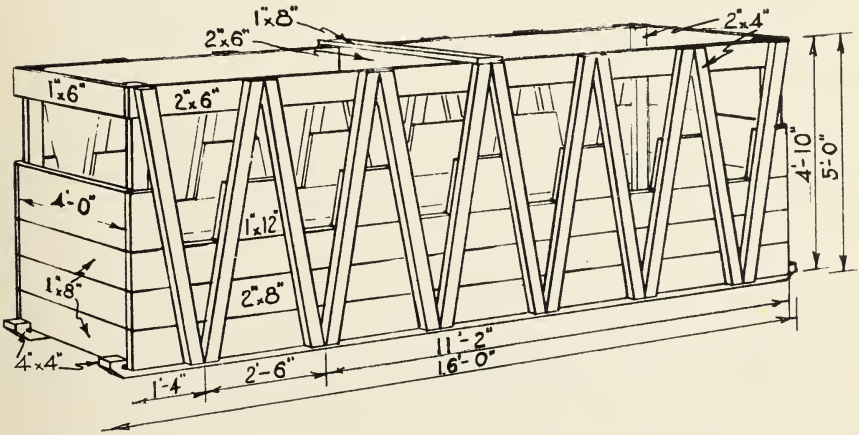
It takes about 20 minutes to load the trailer, which is then unloaded by 4 endless chains equipped with angle-iron cleats placed every 4 feet. The cleats are 1½ inches high. These endless chains operate from a power take-off from the tractor. The wheels on the trailer are airplane type. The main body is steel and the sides are of wood.



Cross section of a portable bunk.



Isometric drawing of the portable bunk shown in cross section above.



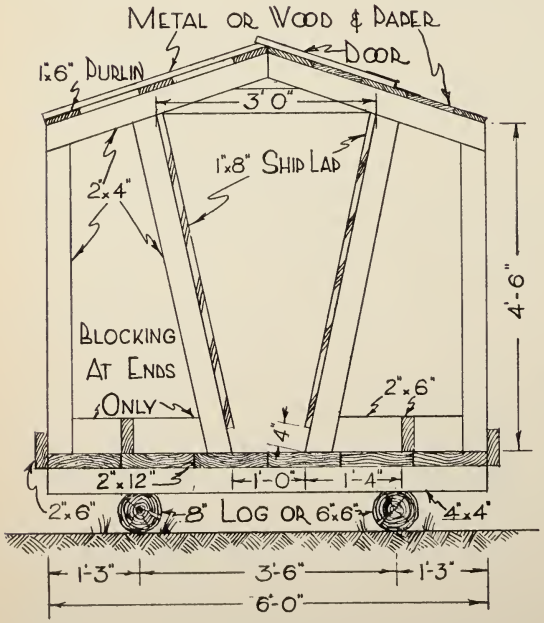
A portable hay rack, suitable for 12 animals. It has a capacity of about ⅔ ton of long hay.

Self-feeders save labor

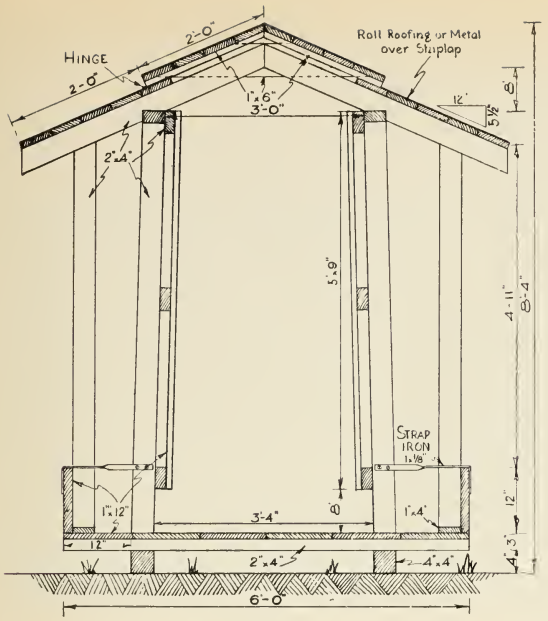
Self-feeding of concentrates and chopped hay is a practical labor saver, especially in range feeding or in connection with irrigated pastures. The feeder shown on this page is suitable for feeding cottonseed meal salt mix on the range. It has a capacity of 9 cubic feet per foot of feeder, or about 360 lbs. per foot, assuming feed weighing 40 lbs. per cubic foot. A 10-foot feeder will hold 3,600 lbs. of feed. Feeders of this type should be constructed to allow about 6 inches of space for each animal. Such feeders are usually placed about one mile apart on the range and *always near an ample supply of fresh water.*

Self-feeding of chopped hay and grain mixtures requires that the sides of the feeder have a slight slope or "batter" to the outside, as shown at top of opposite page. The sides slope outward from a width of 3′ at the top to 3′4″ at the bottom. The side boards are run vertically so as to present a smooth surface to the hay. The capacity of this feeder is 18 cubic feet per foot of feeder, or (if the feed mixture weighs 10 lbs. per cubic foot) 180 lbs. per foot. A feeder 8 feet long will hold 1,400 lbs. of hay and grain mixture. Allow 1 foot of space at this feeder for each animal.

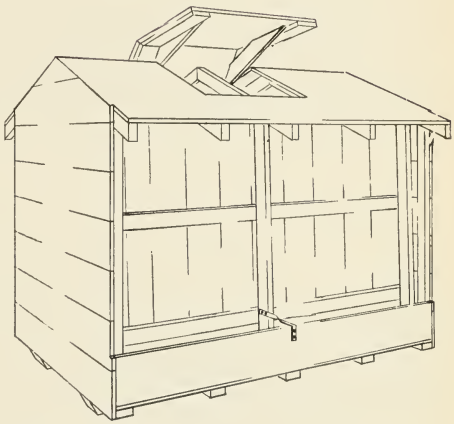
Self-feeders for creep-feeding calves are usually placed near the water or other places where cattle congregate. The type of feeder illustrated on page 28 does not require any fencing. This plan was prepared by William King, Farm Advisor of Kern County, California. Nursing calves are usually allowed access to creep-feeders. This practice is followed when the feed supply is limited or when such calves are to be fattened at an early age to be marketed at about 900 pounds.



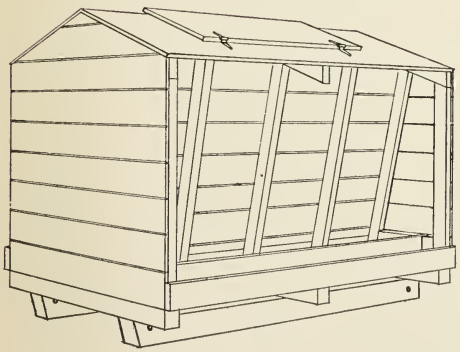
Cross section of a self-feeder for salt and cottonseed meal supplement. It is made on skids for portability.



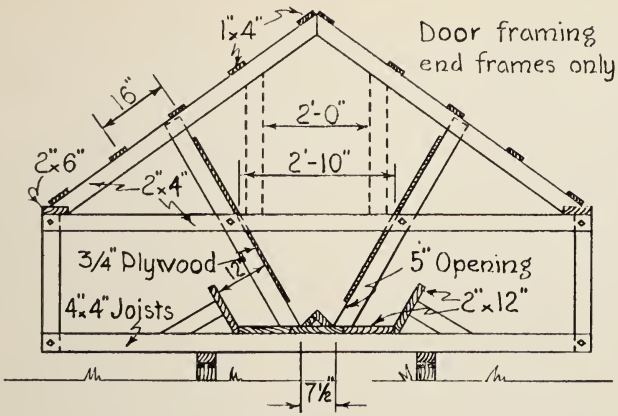
Self-feeder for chopped hay and grain. Note that the sides are 4 inches farther apart at bottom than at top, to prevent bridging.



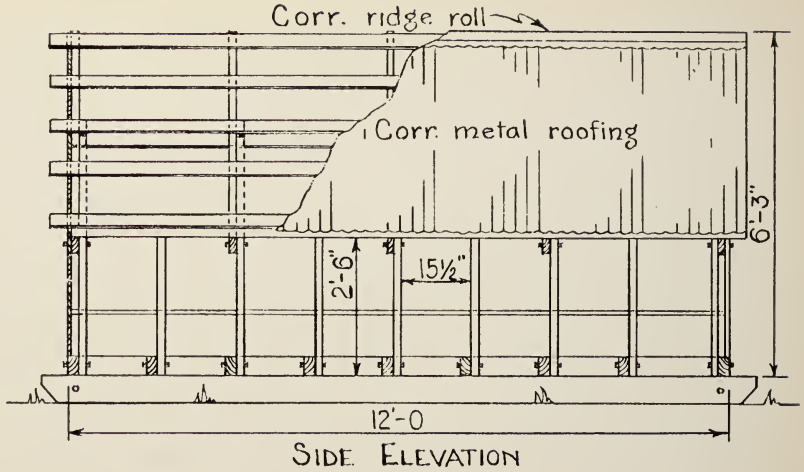
Perspective view of the self-feeder shown above.



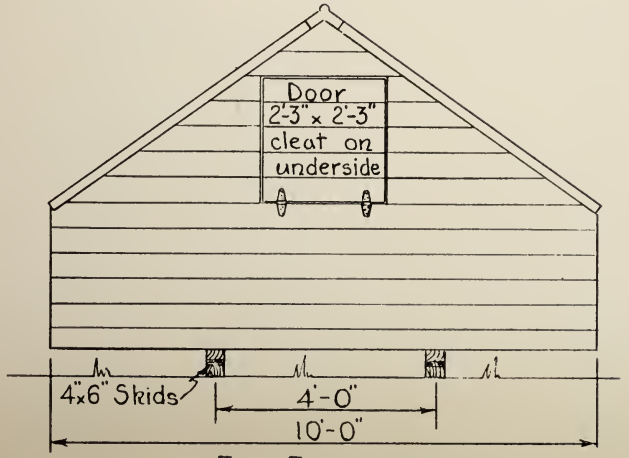
Perspective view of the self-feeder shown on page 26, but with 6" x 6" skids instead of unfinished logs.



FRAMING



SIDE ELEVATION



END ELEVATION

This self-feeding creep feeder for calves is mounted on skids. It is a complete unit, yet is readily portable. The bin holds about 1,000 pounds of feed concentrates.

Here are two efficient pieces of equipment that may be used for picking up chopped green material from the field (above), and distributing it to the feed yard (below).

There are several ways to feed molasses

The use of molasses as a livestock feed is increasing. It is estimated that between 50 and 100 million gallons are fed annually to livestock. It is a very palatable feed, and contains about 70 per cent as much total digestible nutrients as does barley. During the past several years, molasses has been an economical feed compared with other concentrates of equal value. Because of its palatability it is especially valuable, when used on less palatable feeds, for inducing livestock to consume large quantities.

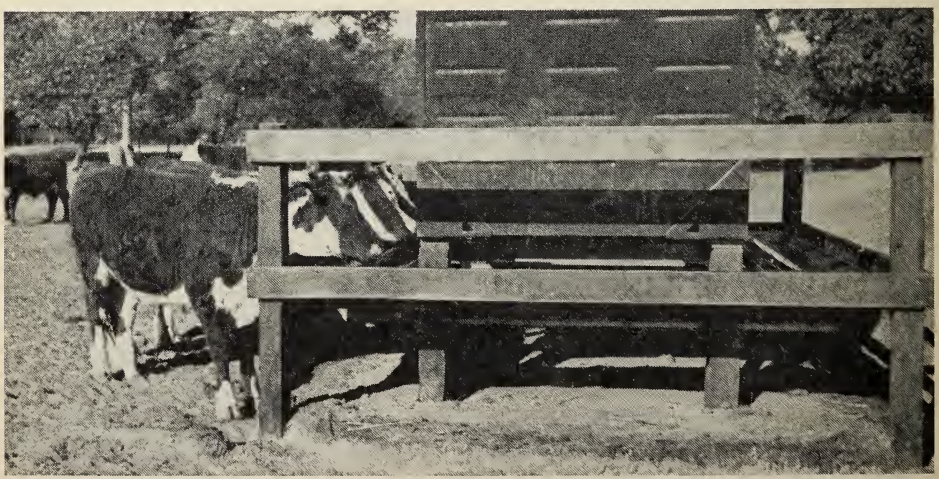
1. Open trough. Feeding molasses free choice in open troughs is quite a common practice. If the molasses drum can be placed in the trough with the plug out and the open hole down, it will serve as a self-feeder. To keep the cattle from smearing themselves with the feed, thereby wasting the molasses, some growers place a light-weight, slatted cover in the trough, which floats on the surface.

2. Pontoon tank. Another molasses self-feeder that has been found practical is a Navy pontoon tank. It is 5 feet wide, 7 feet long, and 7 feet high, and is supported on a platform approximately 30 inches from the ground. Small metal troughs, oval in shape and about 6 inches deep, are built on four sides of the tank. A 4-inch roller is constructed through the center of each trough. Baffleboards are placed from the edge of the trough to within about 1 inch of the roller.

Molasses is supplied to the troughs through a float valve similar to that used in watering troughs, and cattle secure the molasses by licking the roller. This type of molasses self-feeder (shown below) can be bought on the market or built on the ranch. (See Plan 29, p. 35.)

3. Sprayed on feed. Where small numbers of livestock are being fed molasses, it can be poured or sprayed on the feed. When molasses is fed in this way, it is diluted with water at the rate of about 1 gallon of water to 2 of molasses. Rigs used for spraying cattle or controlling weeds can be used for spraying molasses on the feed *if they have been thoroughly cleaned.* In some of the larger feedlots, special tanks placed on trucks and equipped with a spray boom are used for feeding molasses.

4. Mixed with feed. Probably the most common method of feeding mo-



A molasses self-feeder constructed around a surplus Navy pontoon tank by Mr. Stanley Cahoon, Soledad, California.

lasses is to mix it with the feed. This requires more labor and equipment than do any of the other methods mentioned. It is best to use the molasses-mixed feed within a few days after mixing, since there is a tendency for feeds of this kind to cake when stored for any length of time. If such feeds are stored, they should be dry and should contain not more than 15 per cent molasses.

The most common type of continuous mixer consists of a large trough in which revolve one or two shafts carrying teeth, arms, or auger flights. The dry feed and molasses are poured into one end and are mixed as they pass along the trough and flow out the other end. Mixing can also be accomplished by running the molasses into the blower of a grinder or chopper or spraying it into the cyclone collector on the outlet of the grinder. A feed mix of more than 15 per cent molasses should never be attempted in hammer mills or blowers. Molasses viscosity may be reduced by adding water, but this should never be done if feed is to be stored for any length of time.

If over a pound of molasses per head per day is fed to cattle while they are grazing on lush green pasture or when most of their roughage diet is composed of green-chopped feed, it may inhibit gain.

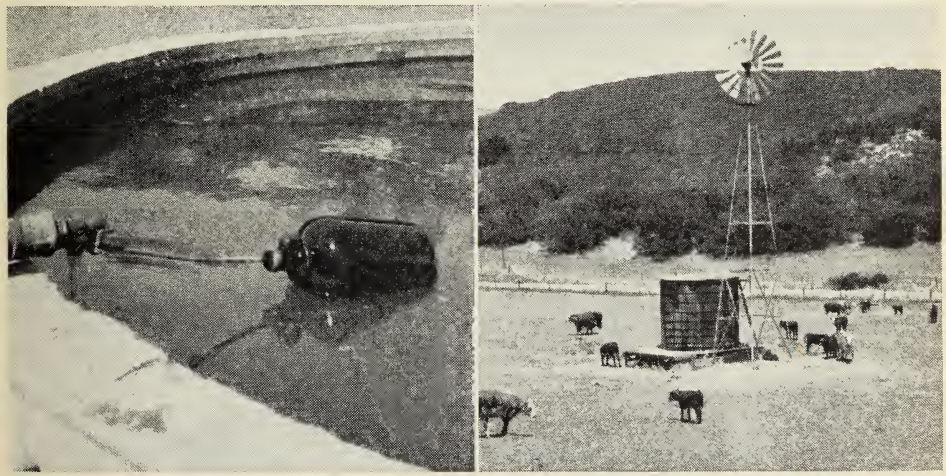
Provide drinking water

Good, clean, fresh water should be provided in feed corrals at all times. Place the trough so that it can serve at least two corrals. Good troughs are usually about 16 feet long and 3 feet wide. Oval-shaped bottoms are desirable for cleaning and draining the trough. Floats insure a continuous supply of water.

A float constructed of a 1-gallon glass jug attached to a commercial shut-off valve by means of a ⅛″ pipe is shown in the photo below. Threads to fit a ⅛″ pipe coupling are cut on the fulcrum of the valve base. The other end of the pipe (15–18″ long) is fastened to the jug with lock nuts.

Cattle on feed in most parts of California will drink between 10 and 12 gallons of water per head per day. In the hot interior valleys the amount may reach 15 gallons per head per day. If drinking water is kept to a temperature under 70° cattle may gain more satisfactorily.

A plan for a 20-foot tower to support a 5,000-gallon circular tank is available. (See Plan 82, p. 35.)



Left: a concrete watering trough, with ranch-made float. Right: water storage tank and windmill using natural slope to fill trough.

Barns must be large enough to hold the amount of feed necessary for the number of animals to be fed through a given period. The interior arrangement should be such that the barn can be cleaned easily. Beef cattle do not require a warm shelter, but it is desirable to protect them from cold rains, snow, and wind. Complete working plans for the construction of four different types of feed and shelter barns are available (see page 35).

A cross section of Plan 136 is shown opposite. This barn has a gable roof, the hay mow space down the center of the building being 24 feet wide and 20 feet high to the plates. A 6-foot feed alley (including manger) extends along each side of the hay storage the full length of the barn. Sheds 14 feet deep to the manger curb, with a low overhanging eave, closed ends, and sides entirely open, prevent rain being driven very far into the interior, and dry out readily.

The barn shown at center of page 33 is similar to the one in Plan 136 except for the type of roof. The monitor-roof type brings the shed roofs a few feet lower and cuts down on the mow space above the cattle-shelter shed. Full details of construction are shown in Plan 137. The plans show wooden lock stanchions, but a V-opening feed rack may be substituted.

Chopped hay, being more "fluid" than long hay, exerts a greater pressure on the walls. Plan 138 (bottom of page 33) has sloping or "battered" sidewall posts along the mow, to relieve the walls of lateral pressure as the chopped hay settles. A small blower pipe opening in the peak of the gable substitutes for the usual hay doors.

The three barn plans just described all have open sheds on the sides for cattle shelter. They can be cleaned with mechanical equipment on tractors, but they have the disadvantage that the supporting posts on the outside must be worked around. A design for a feed and shelter barn with the shelter-shed roof cantilevered out from the side of the hay storage without supporting posts is shown on page 34.

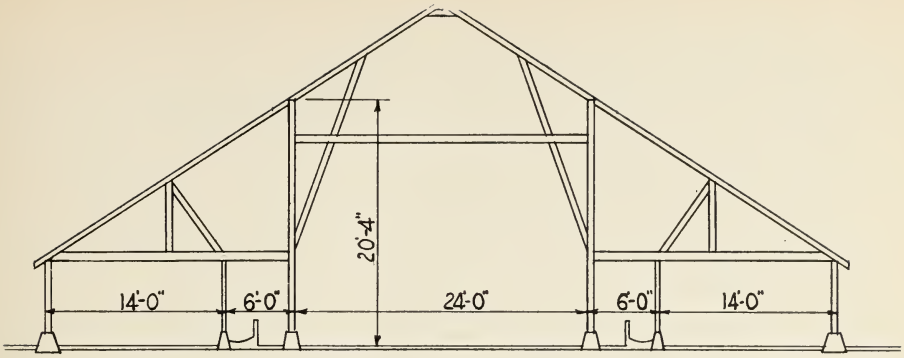
An area 12 feet wide outside the manger is paved with concrete. This allows animals to pass around behind those standing at the manger. Because of the absence of posts, the paved area can be scraped clean quickly with a blade on the front of a light tractor, and the 4-inch curb assures positive drainage to one or either end. This is Plan 225.

Cantilevered shelter sheds have the advantage of being easily cleaned, with no posts to interfere with equipment or injure cattle. Details of cantilever construction for chopped-hay barns are shown in the two drawings at the bottom of page 34. This type of roof is not recommended for areas with heavy snowfall because it is not designed to support a heavy load. For the same reason it is better to cover the shed with some type of metal roofing rather than heavier sheathing and shingles. Cantilever-type barns are increasing in popularity in California.

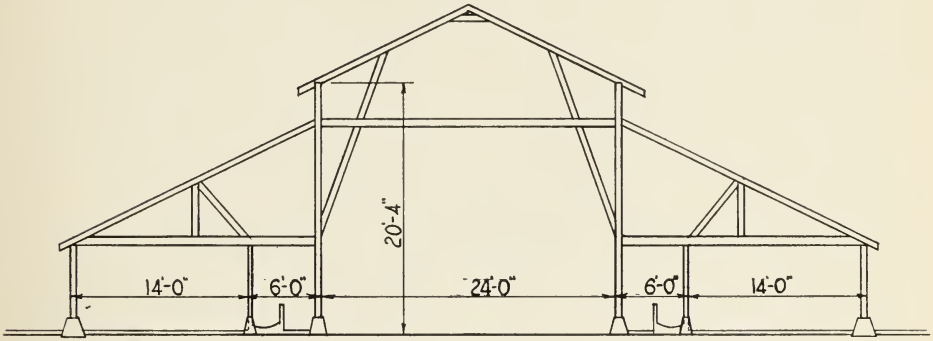
Capacities of Feed Barns

Before building, consider the amount of hay storage necessary to see the animals through the feeding period. The size of the barn will depend upon the number of animals, the months of the feeding period, amount fed per day, and density or weight per cubic foot of the hay. The latter will depend upon whether the hay is loose, baled, or chopped; how long it has been in storage; and what the depth is.

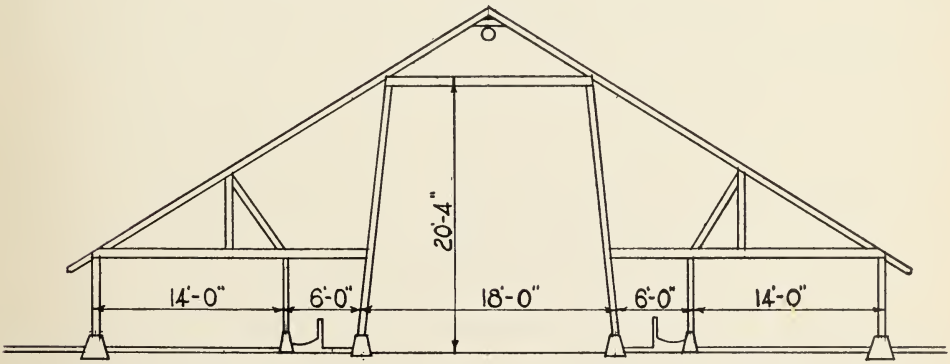
The table (p. 35) gives the capacity of each of the four barn plans just discussed *per foot of barn length*, for long, baled, and chopped hay. An average figure for



A gable-roof barn (Plan 136) showing hay storage manger locations.

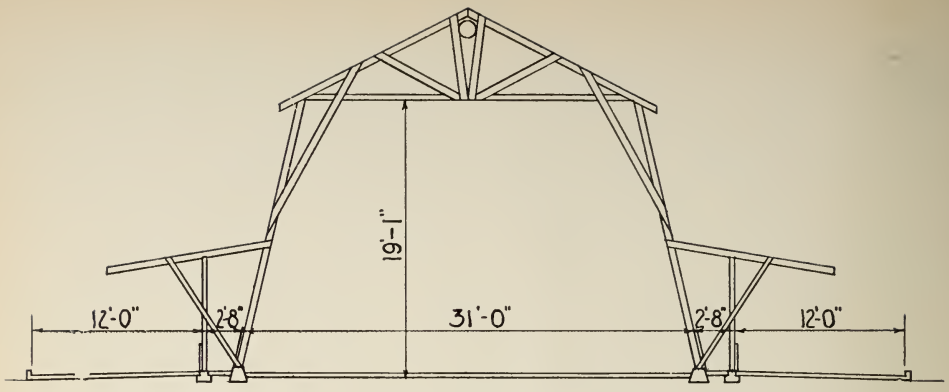


A feed and shelter barn with monitor roof (Plan 137).

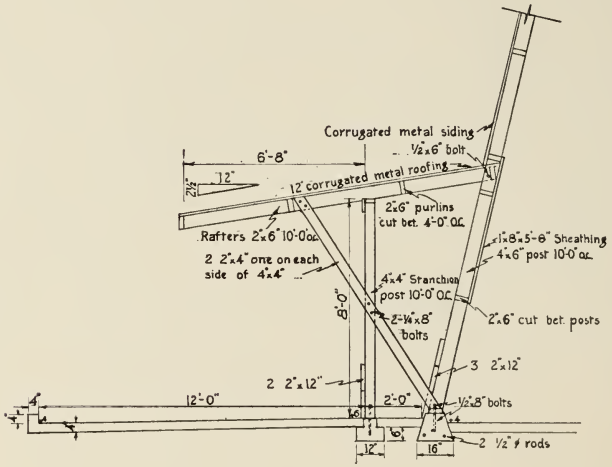


A feed and shelter barn especially designed for chopped hay (Plan 138). Sloping the side posts along mow relieves them of pressure when the hay settles.

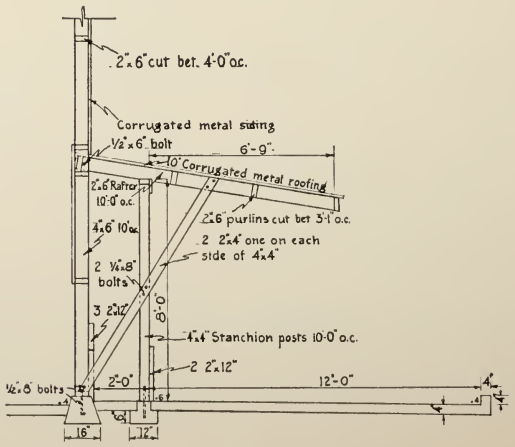
NOTE: Plans for a cantilever-type shelter shed are given on the following page.



A feed and shelter barn for chopped hay having cantilever shelter shed with no supporting posts (Plan 225).



Details of cantilever construction for chopped-hay barns.



Capacity per Foot of Barn Length

	Barn Plan No.			
	136	137	138	225
Volume (cu. ft./foot of barn length)	480	480	320	512
Capacity (ton/foot of barn length)				
Long hay	1.0	1.0	0.7	1.0
Baled hay	2.5	2.5	1.5	2.5
Chopped hay	2.8	2.8	1.9	3.0

the density of loose hay has been considered as 4 lbs. per cubic foot, for baled hay as 10 lbs., and for chopped hay as 12 lbs. (500, 200, and 170 cu. ft. per ton, respectively).

Two and one-half feet of manger per animal is usually considered enough for dehorned beef cattle. Thus, with shelter barns and mangers on either side of the feed barns, each two animals will have in front of them 2½ feet of hay storage, or 1¼ foot per animal.

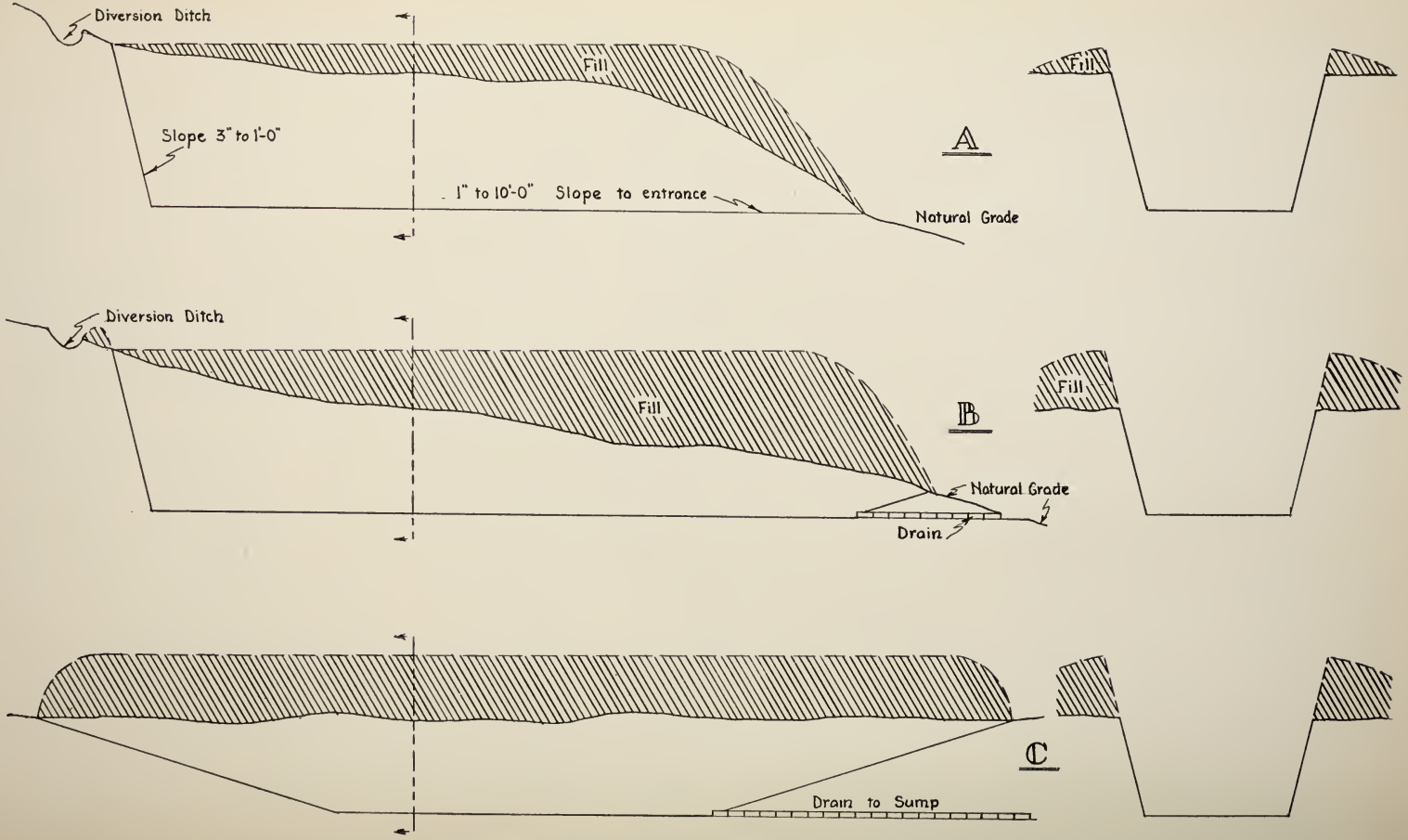
The capacities given above for hay, divided by the daily amount fed per animal, and multiplied by 1¼, will give directly the number of days' feed that can be stored. For instance, if 30 lbs. per day is fed per animal, Plan 138 will provide 158 days' feed when chopped hay is fed, $\frac{(1.9 \times 2{,}000 \times 1.25)}{30}$, and only 58 days if long hay is stored, $\frac{(0.7 \times 2{,}000 \times 1.25)}{30}$.

YOUR UNIVERSITY OF CALIFORNIA FARM ADVISOR CAN SUPPLY THE FOLLOWING FEEDLOT AND STORAGE PLANS

or order from Agricultural Publications, 22 Giannini Hall, University of California Berkeley 4, California

Plan No.		Price
29	Molasses self-feeder	$ .40
32	Hay manger, 15-ft. openings for 12 head	.15
39	Basket type feed rack for cattle. 14′-8″ long by 4′-7″ wide	.15
82	Farm water tower	.25
88	Feed bunk for silage. Wood construction on skids. Bunk 2½ x 16 ft. long	.15
136	Feed barn with gable roof	.75
137	Feed barn with monitor roof	.75
138	Feed barn for chopped hay	.75
139	Shelter shed, 16′ deep, one open side	.50
171	Calf creep and self-feeder. Includes concentrate self-feeder, hay rack, details of creep fence 4′ x 10′ x 6′ high	.25
225	Feed storage barn for chopped hay, with cantilever-type feeding sheds on both sides	1.00
226	Feeding floors and mangers for beef and dairy cattle	.25
5800	Bunker type, aboveground, horizontal silo	.25
5801	Self-feeding fences for bunker silos. Several types	.25

ESTIMATED FEEDLOT COSTS APPEAR ON PAGE 40



Three possible arrangements of trench silos: A. on a hillside; B. on a gentle slope; C. on level ground.

A well-drained trench silo

With the introduction of better varieties of corn and of various other silage plants, the use of silage is each year becoming more popular in California. Hay can be replaced by silage at the ratio of 3 lbs. of silage to 1 lb. of hay. Recent tests indicate that cattle can be successfully fattened with silage as the sole source of roughage.

Trench silos provide economical storage for the feeder if suitable precautions for drainage are taken and the silage is adequately packed while trenches are being filled. This type of silo is well adapted to the use of a field harvester, since the trucks of cut feed can be emptied by false bottoms or by cables hitched to a post in the ground. A blower is not needed at the trench. A trailer of the type shown on page 29 can be used for this purpose.

Dig the silo on the side of a hill if possible. Ditches should be placed in the hill above the silo to divert surface water. Some users construct a tile line down the center of the trench bottom to carry away surplus juices to a dry well, open drainage ditch, or sump.

In the sketches opposite, three general layouts for trench silos are shown, including the three most usual conditions of grade slope. The sides should be sloped inward from 3 to 5 inches per foot of depth. Capacities of trenches of various depths and cross-sectional area are given in University of California Circular 411, "Silage, Silage Crops, and Silos," obtainable from your local Farm Advisor or through the Agricultural Publications Office, Berkeley.

Corn silage, if well packed, will weigh between 30 and 40 lbs. per cubic foot, 35 lbs. usually being assumed. If the ground-water level will allow a depth of 10 feet, a capacity of 1½ tons per foot of trench may be obtained with a top width of 11 feet, bottom width of 6 feet, and side slope inward of 3 inches per foot. However, some locations may not allow such a depth because of a higher water table, and some soils may not stand up at this slope. Each location and condition presents its own problems.

In general, the bottom of the trench should slope about 1 inch per 5 feet toward the outlet (if on a hillside) or toward the inlet to the drain tile. If more convenient, the drain can be placed in the center of the trench. When natural drainage is not available, the tile may be emptied into a sump and be pumped out to a surface-drainage ditch. The earth removed from the trench may be banked up beside the silo to form part of the walls. It should be packed well before filling and, to allow for complete settlement, should not be lined until the second year. Either concrete or wood may be used for lining if desired, although trenches have been used for years in some areas with only a scraping down of the earth walls before filling each year.

A cement plaster, 2 or 3 inches thick, makes a good lining for firm soil. Apply a plaster of 1 part cement, 3 parts sand, and 3 parts pea gravel, over wire mesh held to the wall with spikes. Planks set vertically may also be used. Horizontal nailing rails of 4″ x 4″'s should be let into the sides of the trench, about 4 feet apart. A larger timber would be better for the upper plate.

Roofs are not generally necessary for trench silos in California. Good practice is to fill the silo 3 or 4 feet above the top of the trench, pack each load with a tractor, allow to settle overnight, and then refill to the same level with more silage. The silage can then be overlaid with heavy kraft paper and covered with several inches of earth to keep out air. Some feeders cover the silage with several inches of straw, chaff, or other material, wet it down, and seed barley. The roots of the sprouted barley make a firm and fairly air-tight cover.

If a truck is going to be used for emptying the silo, it should be recognized

that the bottom of the trench may be very muddy. It may be more convenient to lay down planks or other surfacing material on the trench bottom before filling rather than during emptying.

Aboveground silos

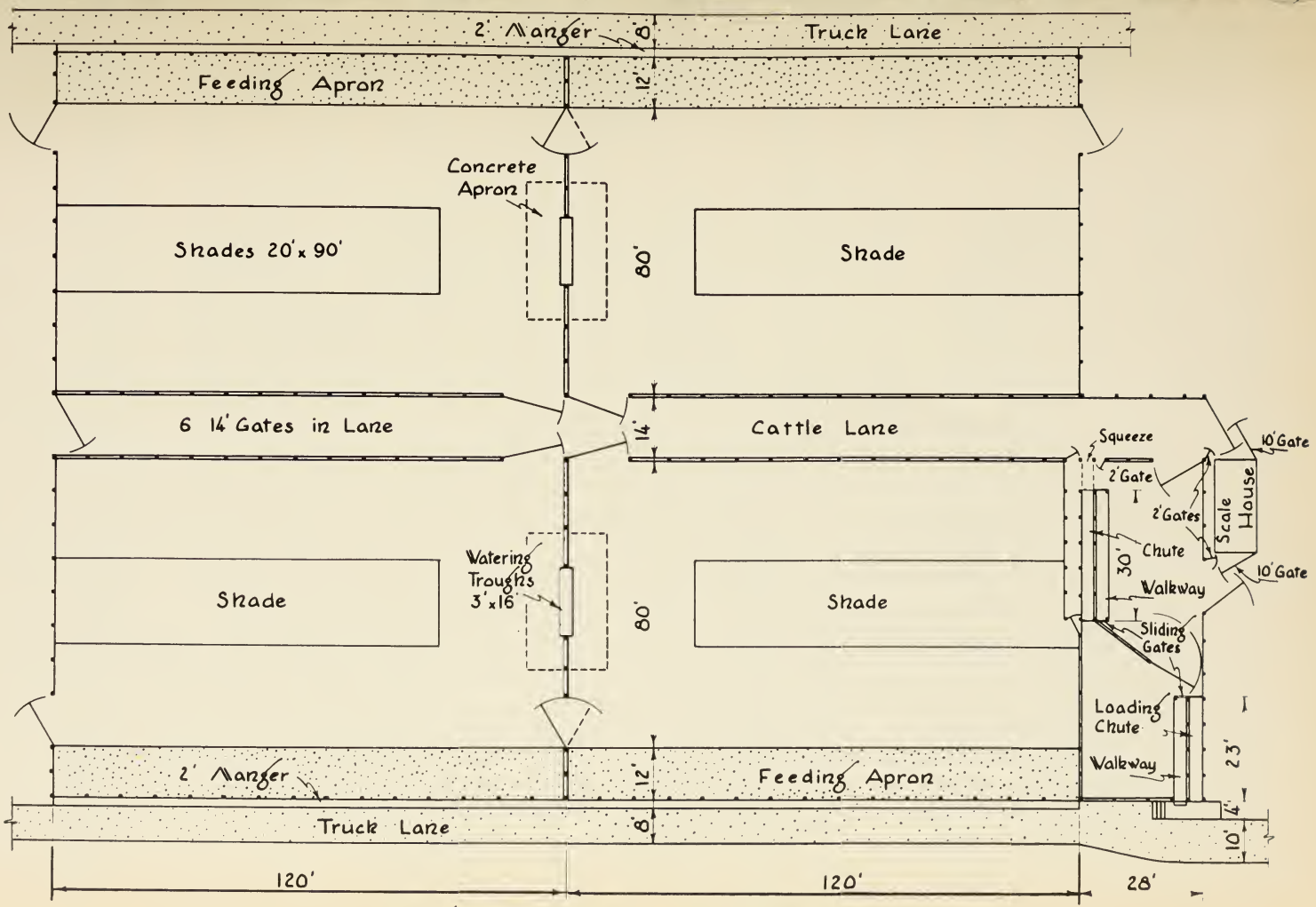
Aboveground bunker or trough silos are popular in California. They are especially suitable for saving labor in feeding. They may be constructed of concrete or wooden walls. A concrete floor is advisable. One advantage of aboveground trough, bunker, or horizontal silos is that they may easily be made self-feeding. Two plans (Nos. 5800 and 5801) are available for the construction and use of bunker silos and self-feeding fences for bunker silos. (See page 35 for a list of plans.)

ESTIMATING COSTS OF FEEDLOTS

A small, four-pen feedlot, suitable for about 200 head of cattle, is shown in the plan opposite. At 50 head per pen, each animal will have about 220 sq. ft. of corral space. If shade is required, the sketch shows an allowance of 36 sq. ft. per animal. Shades should be at least 10 feet high for greatest cooling effect, and preferably oriented east-west. However, in wet areas, greater drying effect will be obtained if the shades run north-south.

Each animal is allowed 2½ feet of manger. The area back of the manger is paved for a distance of 12 feet. The feed truck lane is also paved. One water trough, mounted on a concrete platform, serves two pens. Gates 14 feet wide, between the pens, enable manure-cleaning equipment, such as bulldozers, elevators, and trucks, to be easily maneuvered without going through the cattle lane. The work corral, with branding chute, squeeze, scale, and loading chute, is located so that animals can be brought in from any pen, sorted, weighed, loaded, or otherwise handled. The capacity of this feedlot can be expanded by increasing the number of pens to the left.

Plan for a four-pen feedlot. This will accommodate about 200 head of cattle at 50 head per pen. Each animal will have 2½ feet of manger. Pens might be added at left to increase the lot's capacity if desired.



All gates 12'-0" unless otherwise dimensioned.

ESTIMATED MATERIALS AND COSTS FOR FOUR PENS

(Figures do not include work corral, scales, shades, water pipe and well. Assume pen fences of four Douglas fir 2" x 6" 's bolted to 6" x 6" redwood or treated posts.)

Concrete:

MATERIALS		COSTS
Truck lane, 8' x 480', 6" thick... 71 cu. yd.		
Paved manger bottom and standing platform, 14' x 480', 4" thick.. 83 cu. yd.		
2 tank platforms, 19' x 32', 6" thick ..... 23 cu. yd.		
Total.....177 cu. yd.	Ready-mix concrete @ $14 per cu. yd.....	$2,478.00
Labor and material for forms, placing and finishing concrete, estimated at 25 per cent of cost of materials if ranch labor is used.....		619.50
	Total cost for concrete work.....	$3,097.50

Feed Corral and Mangers:

172 posts, 6" × 6" × 8'	@ $2 each	$ 344.00
Corral fence: four 2" × 6"'s (double on partition fences), and about 412 2" × 6" × 16', or 6,592 bd. ft.	@ $120 per M	791.00
Manger: 480 lineal ft.	@ about $1 per lineal ft.....	480.00
Five 12' gates	@ $35 each	175.00
Six 14' gates	@ $40 each	240.00
	Total cost of fence materials.....	$2,030.00
Labor, 50 per cent of cost of materials, using ranch labor.....		1,015.00
	Total cost, fences, mangers, gates, etc.....	$3,045.00

Hardware:

2 water tanks, 3' × 16'	@ $150 each	$ 300.00
Bolts for fence:		
300 machine, ½" × 8"	@ 10 cents	30.00
224 machine, ½" × 10"	@ 12 cents	26.88
1,050 plate washers for bolts, 4" × 4 " × 3/16" thick	@ 4 cents	42.00
	Total for hardware.....	$ 398.88

TOTAL COST OF FEEDLOT CORRAL..... $6,541.38

The total cost of the feed lot corral is $6,541.38. The average cost per head is about $33. Feed mill, well, and piping are not included in this total cost. Costs of work corral and equipment are estimated below.

ESTIMATED MATERIALS AND COSTS FOR WORK CORRAL PLANS ON PAGE 4

MATERIALS FOR BRANDING CHUTE AND SQUEEZE		COSTS
Posts:		
14 posts 8′ long 6 posts 10′ long	@ 25 cents per lineal foot	$ 45.00
Lumber:		
2″ × 4″, 60 lineal ft. 2″ × 6″, 396 lineal ft. 2″ × 8″, 120 lineal ft. 2″ × 10″, 60 lineal ft. 18 1″ × 6″'s, 8 ft. long (gates)	@ $120 per M bd. ft.	92.00
Hardware:		
4 lbs. 10d nails	@ 15 cents lb.	.60
12 lbs. 30d nails	@ 15 cents lb.	1.80
Miscellaneous (pipe, steel, etc.)		12.00
¾ cu. yd. concrete	@ $14 per cu. yd.	10.50
Commercial cattle squeeze		400.00
	Total for materials	$ 561.90

MATERIALS FOR LOADING CHUTE		COSTS
Posts:		
13 posts 12′ long 4 posts 10′ long 4 posts 8′ long	@ 25 cents per lineal foot	$ 60.00
Lumber:		
1″ × 6″, 192 lineal ft. 2″ × 6″, 1,026 lineal ft. 2″ × 8″, 160 lineal ft. 2″ × 12″,160 lineal ft.	@ $120 per M bd. ft.	198.50
Hardware:		
52 machine bolts, ½″ × 10″	@ 15 cents	7.80
96 machine bolts, ¼″ × 3½″	@ 4 cents	3.84
Washers for above		2.00
35 lbs. 30d nails	@ 15 cents lb.	5.25
Miscellaneous hardware and steel		20.00
	Total for materials	$ 297.39

Costs continued on next page

MATERIALS FOR WORK CORRAL FENCE		COSTS
15 posts 8′ long		
4 posts 10′ long	@ 25 cents per lineal ft.	$ 40.00
64 2″ × 6″'s, 16 ft. long	@ $120 per M	122.90
Four 12-ft. gates	@ $35	140.00
Two 10-ft. gates	@ $30	60.00
Five 2-ft. gates	@ $5	25.00
	Total for materials	$ 387.90
Scale, 8′ × 20′ (without scale house)		$ 700.00
Labor, estimated at 50 per cent of cost of materials (less commercial squeeze and scale)		$ 423.60
	TOTAL COST OF WORK CORRAL	**$2,370.79**

NOTE: This equipment will handle a much larger feedlot than the four pens shown on the plan. However, all the equipment shown is needed for efficient operation of even a small feedlot.

TIPS ON HANDLING CATTLE

Follow these suggestions and prevent costly bruises:

Dehorn cattle, preferably when young, or use a polled bull.

Remove projecting nails, splinters, and broken boards from feed racks and fences.

Keep old machinery, trash, and any obstacles that may cause bruises out of feedlots.

Do not feed large amounts of grain to cattle just before loading.

In hot weather, get stock away early to avoid extreme temperatures.

Use good loading chutes, not too steep.

Bed with sand free of stones to prevent slipping during shipment.

Cover sand with straw in cold weather.

Provide covers for trucks to protect cattle from sun in summer and cold in winter.

Always partition mixed loads to separate classes of livestock.

Remove protruding nails, bolts, or any sharp objects from trucks or cars.

Load cattle slowly to prevent crowding against corners and to avoid excitement.

Do not overload.

Use canvas slappers instead of clubs or canes.

Tie all bulls in trucks or cars.

Inspect load en route to prevent "downer" cattle.

Back truck slowly and squarely against unloading docks.

Drive carefully. Slow down on sharp turns and avoid sudden stops.

Unload slowly. Use cleated inclines.

CONTENTS

In order that the information in our publications may be more intelligible it is sometimes necessary to use trade names of products or equipment rather than complicated descriptive or chemical identifications. In so doing it is unavoidable in some cases that similar products which are on the market under other trade names may not be cited. No endorsement of named products is intended nor is criticism implied of similar products which are not mentioned.

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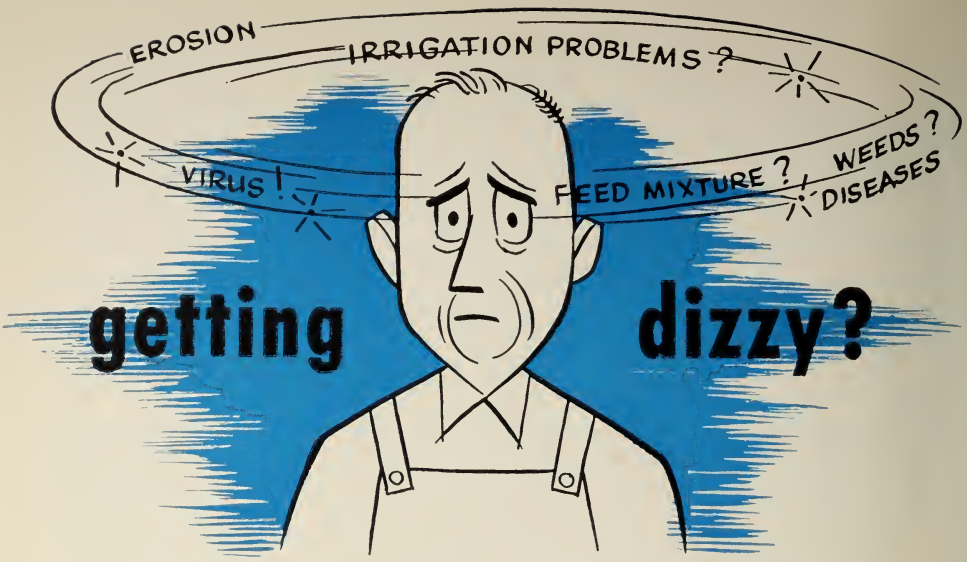


IT JUST COULD BE . . .

that the farm problems troubling you have also troubled others.

And it's also possible that with a little help from the right source your problems can be eased, if not cured.

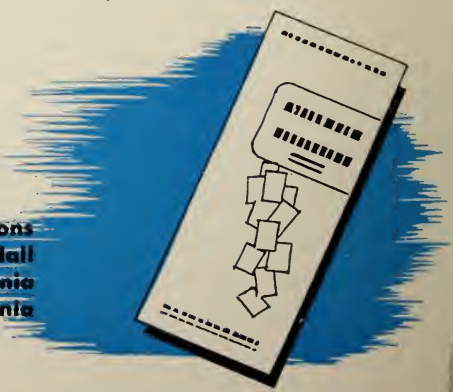
Here's how to go about getting help.

Take your problems to your County Farm Advisor. He's an agricultural specialist with a background of practical knowledge about farming in your locality. He will help you if he can . . . or he will get the information you need from someone who does know the answers.

Ask your Farm Advisor for a copy of AGRICULTURAL PUBLICATIONS—a catalog that lists the bulletins and circulars produced by the University of California College of Agriculture, or write to the address below.

You'll be amazed at the wide range of information covered in these publications.

Yes . . . it just could be that your problems aren't nearly as hard to solve as you think. Make use of the free services of your University.



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