

Texas Livestock Auction Markets ... Methods and Facilities

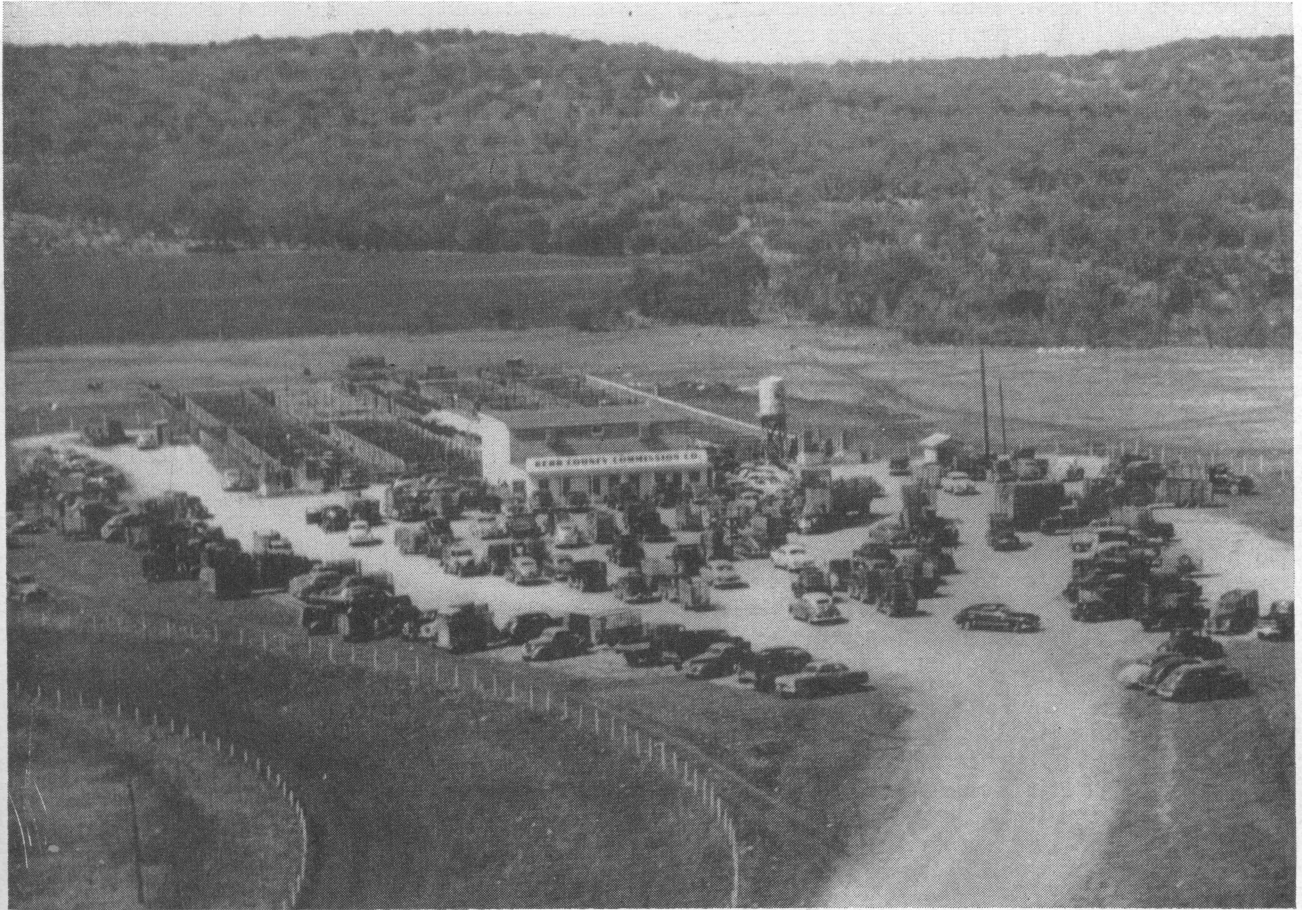
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PREFACE

The auction market is a rapidly growing institution in the marketing of livestock. With the rapid increase in the number of these markets, it was almost inevitable that facilities would be constructed in some localities where prospective receipts were too small to attract buyers or otherwise to make the facility a going market. In such cases the ventures usually were failures. In many other localities the facilities were not properly designed and arranged for the most efficient operation. Market operators either are not obtaining the desired rate of sale or are maintaining such a rate with excessively large labor costs.

The research which is the basis for this report was undertaken to develop principles and criteria which could be used in establishing and operating auction market facilities in order to enable their operators to achieve internal efficiencies and provide necessary services to market patrons at reasonable rates. This research also provides the basis for a second report, now being prepared, which will cover such external factors as location of markets in relation to areas of supply and demand, size of the area served by auction

markets, and the relationship, if any, of the volume of receipts to the number of buyers patronizing the market.

The data presented in this report should not be interpreted as a recommendation for the construction of additional markets. The need for new or additional facilities in any locality should be determined only after a thorough study of the local situation has been made; and, if a need exists, facilities should be planned accordingly. Improvements in existing facilities should be planned on the same basis.

The Marketing and Facilities Research Branch, Production and Marketing Administration, and the Texas Agricultural Experiment Station, on request, will assist in conducting studies and developing plans for facilities in specific localities where the need for improved facilities exists. Obviously, the Texas Station must limit its service in this connection to Texas areas and both agencies are limited in the service they can give jointly or independently to the resources available to them.

DIGEST

A livestock auction market is a facility where livestock are assembled and sold on regularly scheduled days by the auction method. The importance of this kind of facility in the marketing of Texas livestock is shown by the fact that in 1952 there were sold on the 168 auction markets in the State, 3,566,157 cattle and calves, 853,694 sheep and goats, and 554,126 hogs.

The planning of improved facilities for Texas livestock auction markets is affected by a number of practices that have become established through the desire of market operators to provide buyers and sellers the services demanded. Among these practices are: (1) providing buyers and sellers separate sets of holding pens, and, on demand, providing sellers with separate pens regardless of the size of the consignment; (2) selling animals singly or in groups in accordance with the consignor's instructions; (3) providing the service of cutting or sorting livestock into uniform groups by age, size, sex, color and condition; (4) weighing livestock as it leaves the sales ring; and (5) feeding and watering livestock in accordance with the owners' instructions.

The principal defects of a majority of Texas livestock auction markets are: (1) poor arrangement of the market yards, which results in large yard crews, long drives, mixups and strays; (2) inadequate parking space for motor vehicles and uncontrolled parking, which causes traffic congestion; (3) improperly designed facilities for loading and unloading motortrucks with a lack of catch pens for maintaining an even flow to holding pens; (4) improperly designed facilities for driving animals into the sales ring; (5) lack of a sufficient number of small-size cattle holding pens for the efficient utilization of pen space; and (6) auction sales barns with rings either too large or too small for efficient handling of the size groups sold and with improperly arranged seats. The principles developed in this study have as their objective the correction of as many of these defects as possible.

The movement of livestock through an auction market facility is accomplished through three cycles or groups of operations: (1) receiving, (2) selling and (3) loading out. The operations in each cycle are performed in a regular sequence in which animals usually are driven directly from one operation to another. The cycle of operations performed in receiving animals from pickup trucks and automobile trailers is: (1) preparing the receiving ticket, (2) tagging the animals, (3) unloading and (4) driving animals from receiving facilities to assigned pens and penning. When animals are received on large trucks they are first unloaded, then tagged. On the markets studied, an average of about 8 large trucks or 25 small trucks or automobile trailers could be unloaded per hour at each truck dock space or unloading pen.

Most Texas livestock auction market operators measure the efficiency of a market in terms of the speed with which the sale is conducted. The rate of sale sets the pace for all other operations in the selling cycle. This cycle involves the performance of the following operations: (1) bringing up livestock for sale, (2) cutting (sorting and separating), (3) driving animals from cutting pens into feeder-chute holding pens, (4) driving animals into feeder chute, (5) driving animals into sales ring, (6) selling, (7) weighing, (8) assigning to buyers' pens and (9) yarding animals in buyers' pens. The average elapsed time required to sell single animals, both cattle and hogs, on the markets studied was 0.53 minute. The average time required per head decreased as the size of the lot sold increased.

The cycle of loading-out operations involves: (1) checking the tag number of the animals against the buyers' sheets, (2) driving livestock from buyers' holding pens to the loading docks and (3) loading onto motortrucks. On the markets studied, the average elapsed time required to load pickup trucks was 8 minutes, straight trucks 12.7 minutes and semitrailers 25.1 minutes.

On a typical Texas market, with average facilities, a crew of 27 workers, other than office workers, is needed on sales days. Of this number, 24 are required for performing selling operations. Workers are shifted from one cycle of operations to another as required.

To illustrate the principles that should be used in planning a livestock auction market in a specific locality, a market of modal size for Texas is used. Normally this market would handle about 700 cattle and 200 hogs per sale. About 300 additional cattle and 70 additional hogs could be handled on big sales days by slight modifications in normal operations. Other species handled would be in relatively small volume in most Texas areas and would not require special pens. The principal facilities on such a market are the yards, auction barn, market driveways and parking areas for motor vehicles. The yards for the suggested market are 212 feet wide and 290 feet deep and include facilities for loading and unloading trucks and trailers, catch pens, tagging chute, holding pens, alleys, cutting pens and facilities for driving livestock into the sales ring. Catwalks are provided over the yards. The suggested auction barn is 60 feet wide and 72 feet deep plus an annex for the auctioneer's box, feeder chute, scale platform and a small holding pen. The barn proper contains space for market offices, restaurant, lobby, toilet facilities, seating area, and sales ring. A 40-foot main driveway connecting with 100-foot aprons or service driveways and parking space for about 400 motor vehicles are suggested.

The estimated cost of constructing the suggested facilities, without a roof over the cattle holding pens and alleys, under conditions prevailing in 1952, is roughly \$80,000. Covering these pens and alleys would add about \$12,000 to construction costs, and bring the total to \$92,000. This cost of construction should be added to the cost of the land placed in condition to build. A minimum of 12.5 acres of land would be needed.

It is estimated that the suggested facility could be operated on sales days with 4 fewer workers than are now required on a typical Texas market of comparable size or handling a comparable volume of livestock. In addition, some reduction in the labor required for checking animals in buyers' pens after the sale should be possible. The suggested facility also should reduce the usual amount of time sellers wait in line to unload livestock, increase the rate at which buyers' trucks can be loaded and assure an uninterrupted flow of livestock into the ring during a sale.

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Texas Livestock Auction Markets ... Methods and Facilities

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INTRODUCTION

LIVESTOCK AUCTION MARKETS occupy a comparatively important place in the Texas livestock marketing system. According to the Livestock Sanitary Commission of Texas, there were 168 livestock auction markets in operation in Texas in February 1953. Although a few of these markets were established before 1930, the greatest growth has occurred during the past decade. On these markets in 1952 were sold 3,566,157 cattle and calves, 853,694 sheep and goats and 554,126 hogs.

A livestock auction market is a facility where buyers and sellers meet and where livestock are assembled and sold on regularly scheduled days by the auction method. Although most livestock sold on such markets are shipped to other areas, these markets also may serve as a source of supply for local slaughterers and farmers. When the markets are located in the larger towns and cities, a relatively large percentage of the volume handled may be bought by local slaughterers, and the market thus assumes some of the characteristics of terminal livestock markets. This definition of livestock auction markets excludes concentration yards; special sales, such as 4-H Club and registered livestock sales; and public terminal stockyards.

On the basis of species of livestock handled, Texas auction markets are of three general types: cattle only; cattle and hogs; and cattle, sheep and hogs. The kind of livestock produced in the area in which the market is located, rather than the market's sales policy, usually is the primary factor that determines the group into which a specific market falls. With few exceptions, Texas markets sell all species of livestock brought to them: The most important of these three types of markets, from the viewpoint of number of markets and volume of business, is the cattle and hog facility. Over 50 percent of the markets fall into this group. Although markets that handle cattle only are few in number, the volume of business they handle is relatively large because some of the largest markets in the State are limited to the one species. Only one market in 10 is classified as a cattle, sheep and hog auction. Such markets

are confined primarily to the Edwards Plateau where sheep production is rather extensive.

Several factors have contributed to the growth and importance of Texas livestock auction markets. Farmers and ranchmen like the ease and convenience of selling and buying through local markets since they can transport a few head of livestock by trailer or pickup truck to the market on the morning of the sale, wait to see the animals sold and collect their proceeds from the sale before returning home. If they are interested in buying a few head of livestock these usually can be obtained at an auction. Farmers also like the social and educational aspects of auction markets. These markets provide an opportunity to meet friends and to discuss the merits of animals sold in relation to prices received. The large number of spectators at most auctions indicates their attraction to the people of the community.

Object of Study

Because of their rapid growth, a relatively large number of Texas livestock auction markets do not have facilities and equipment for the most efficient handling and selling of livestock. Many of these facilities are improperly designed and arranged and, as a result, require excessive amounts of labor for moving livestock through the market. The rough handling of livestock on a number of these markets—due in part to the design of the facilities—results in an excessive amount of bruising, injuries and shrinkage. A number of these facilities do not afford adequate protection from the elements, particularly during the summer, for the animals offered for sale.

The purpose of the research which is the basis for this report was: (1) to develop principles for use in planning improved livestock auction market facilities, including proper layout, design, size and location; (2) to determine the extent to which established marketing practices may affect facility layouts, designs and sizes, and (3) to develop more efficient methods for unloading, moving livestock through the market and loading out.

In conducting this research, various types and sizes of markets in different geographical areas of Texas were selected for case study. Data were obtained through time studies of performance of each marketing operation at each market selected. In addition, a layout and flow diagram

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of the physical plant was prepared. Specific operations and facilities on a number of other markets also were studied.

The Livestock Auction Market Business

All Texas livestock auction markets are privately owned and operated on a commission basis. (For a more detailed discussion of auction charges, see Texas Station Bulletin 732, "Livestock Auctions in Texas," March 1951.) Ninety-one percent of the markets conduct only one sale each week. The remaining 9 percent operate 2 or 3 days each week. The small number of sales conducted each week per market means that the facilities are not fully utilized, which is in contrast with most other businesses that operate 5 or 6 days each week and make much fuller use of their facilities.

Most markets begin their sales at 9, 10 or 11 a.m., or at 1 p.m., and operate continuously until all livestock brought in have been sold. Sales often run late into the night. Several markets recess an hour for lunch. A few markets halt their sales at 6 or 7 p.m. and, if necessary to dispose of unsold livestock, resume their sales the following day.

Livestock usually are sold by classes and species in the order of their arrival on the market. There are some variations among markets as to the order of sale and the classes of livestock handled. The usual order of sales is hogs, bulls, milk cows, calves and other cattle.

On all Texas markets, the management makes the opening bid on animals offered for sale. Although this bid is made primarily to speed up the sale, the starting bid usually is the buying bid unless a higher bid is made by another buyer. A few markets lower their initial bid if no other bid is made.

Livestock are sold on all markets on the basis of the seller's instructions. If no instructions are given, the management usually accepts responsibility for selling the animals on the basis it believes will result in the highest price. Livestock are sold singly or in groups, and by the head or the pound. The seller has the right to refuse the price offered on one basis and to ask that his livestock be sold on another. He also has the right to refuse any selling price by publicly declaring "P. O." ("pass-out," meaning that the bid has been refused) when the auctioneer says "sold." In this case, the consignor retains possession of his livestock and either pays no commission, the regular sales commission or only a part of the regular commission fee, depending on the market's practice.

All Texas markets pay the sellers for all livestock sold in the ring and collect from buyers. A few markets permit private sales outside the sales ring, but collect the regular commission and process the papers on such transactions just as is

done on auction sales. Private sales are relatively unimportant and are not encouraged by the management. Most markets are ready to pay sellers within 15 minutes after the animals have been sold. Financial losses from bad checks and other fraudulent practices are the responsibility of the market.

As would be expected from a business operating only one day each week, proper labor utilization is a major market problem. Although the problem is particularly acute with respect to yard labor, it also involves office workers. Many markets use farmers, schoolboys or any other laborers who can be employed part time. Most markets have a high labor turnover, particularly of yardmen, and new workers must be trained before then can perform their duties efficiently. Some markets guarantee their workers a full day's wages regardless of the length of the sale. When sales volume is unusually large, a yardman works long hours and receives overtime pay. Other markets pay their workers by the hour or pay a guaranteed minimum with additional wages for each hour of work above the prescribed minimum.

Office work is normally performed by housewives who have had previous office experience. Such workers are comparatively better trained for their respective duties and there is less turnover than with yard help. As a result, office efficiency is usually high. Normally, key personnel such as auctioneers, recorders and weighers, have a weekly circuit of markets and thus are employed on a full time basis. Such employees usually are skilled in the performance of their duties.

Keen competition exists among Texas markets. There are few livestock producers in the State who do not have a choice of two or more markets within a reasonable distance from their farms or ranches on which to sell their livestock. To maintain or expand volume, the managements advertise by newspaper, radio, mail, and personal solicitation. Some markets employ an excessive number of laborers, pay telephone bills and absorb other expenses to maintain the good will of buyers and sellers.

MARKETING PRACTICES THAT AFFECT FACILITIES

Competition among livestock auction markets, and the consequent desire on the part of the management to render service to buyers and sellers, have resulted in these markets initiating practices that have a direct bearing on the layout and design of physical facilities. Although many of these practices are common to all markets in Texas, others are local in character.

Holding Pens for Buyers and Sellers

Nearly all Texas markets have two sets of holding pens for cattle. Sellers' pens are used for holding cattle consigned for sale. Buyers' pens

are used for penning cattle after they have been sold. Because buyers' pens are empty before the sale, and many of the sellers' pens are empty after the sale, a relatively large pen area is required for the number of livestock sold.

Since tagged cattle can be separated by ownership rather easily, cattle of several owners frequently are assigned to the same pen. Pens in which the cattle of several owners are held are called "jack pot pens." Many cattle consignors request individual holding pens and some markets report a loss of business if they are unable to grant such requests.

The number of pens assigned to cattle buyers varies on different sales days with fluctuations in the volume of business. Generally, about 30 percent of the holding pen space is reserved for buyers at the outset of the sale. When all buyers' pens are filled, livestock may be moved into empty sellers' pens. Often large-volume buyers who purchase for several accounts request separate holding pens for each account. Buyers who purchase several classes of cattle may request separate holding pens for each class. Regardless of the volume they purchase, many buyers request separate pens because they do not want their cattle penned with those of another buyer.

Although separate holding pens for buyers may require more pen space than if the cattle were penned together, separate pens reduce the amount of labor required for separating by owners, by owners' accounts or by classes purchased. Loading out is thereby expedited and fewer mistakes are made. Also, since buyers' bills for purchases usually are presented by account and class of cattle bought, the use of the buyers' pens results indirectly in the performance of a bookkeeping service. No data were obtained to indicate whether two complete sets of pens are justifiable. Regardless of its advantages or disadvantages, the practice of providing separate holding pens for buyers and sellers has become firmly established on Texas markets and should be considered in planning improved facilities. Any attempt by an individual market to change or ignore this practice would, no doubt, result in a loss of business.

Because of the difficulty of identifying and separating hogs and sheep by consignors after they are penned together, the established practice on Texas markets is to provide separate holding pens for each seller of these species. Some auctions follow the practice of penning hogs and sheep after the sale in the same pens they were yarded in before the sale.

Size of Lots Sold

Although most cattle are sold singly, nearly all markets sell some groups of cattle. Therefore, the shape and size of most sales rings are designed to permit selling of single animals and also to permit group sales. Although most rings do

not contain space for more than 20 cattle at one time, there are a few rings of sufficient size to permit sales of carloads. Ordinarily consignments are too variable, as to class and quality, to permit many carlot or other large group sales.

In some instances, hogs are sold singly. However, a consignor's hogs usually are cut by size, color, age, condition and sex, and sales of two or more head are common.

Weighing Livestock

With the exception of a few comparatively small markets, all Texas auction markets have scales. The practice on all Texas markets possessing scales is to weigh animals that are sold by the pound as they leave the sales ring. The weighing of livestock actually consummates the sale since the title to an animal customarily changes when it crosses the scale. This practice makes it mandatory that the scales be as near as possible to the sales ring exit.

A relatively large number of livestock is sold by the head even though the market may have scales to weigh animals. Such sales are made at the owner's request or because it is the usual practice in the community for that class of livestock. Ordinarily slaughter livestock are sold by the pound and stocker livestock by the head. It usually is understood that the title to unweighed livestock changes when the auctioneer says "sold" and they leave the ring.

Feeding and Watering Livestock

There are two distinct practices in feeding and watering livestock which have a definite impact on the layout and design of auction market facilities. On some markets, particularly those in West Texas, cattle are watered and fed prior to their sale. On these markets, water and feed troughs or racks are placed in the sellers' cattle holding pens. Other markets feed and water cattle after the sale, and on these markets the watering and feeding facilities are placed in the buyers' holding pens. Thus, in determining the proper location for watering and feeding facilities, the practices of each locality should be considered. Hogs usually are not watered prior to sale. Water troughs usually are placed in buyers' holding pens so that hogs can be watered after the sale.

Cutting Livestock

In Texas "cutting" is the sorting or separating of animals of the same species on the basis of ownership, size, sex, age, color and condition. Pens into which livestock are sorted are called cutting pens.

Some markets which receive large consignments of livestock cut the animals into uniform groups by age, size, sex, color and condition. The animals then may be sold in uniform lots or sing-

ly. Properly located facilities are necessary in performing the cutting service. These facilities include a series of holding pens or a series of alley pens created by the use of block gates. On markets where large consignments are rarely received, the cutting service usually is not performed since these markets are not equipped to provide such service. Under these circumstances, even the animals in large consignments are sold singly.

DESCRIPTION AND DEFECTS OF PRESENT MARKETS

Although there are, on the basis of species of livestock handled, three general types of livestock auction markets in Texas, the facilities on markets of all types are strikingly similar. This similarity exists because cattle are sold on all markets and the facilities used for handling cattle also are used on a number of markets for handling sheep, goats, horses and mules. Facilities used for handling sheep, such as chutes for sorting and dipping vats, cannot be used for handling cattle and hogs. Although certain types of facilities used for handling cattle are used for hogs, nearly all markets on which hogs are sold have some special facilities for this species. The facilities on Texas livestock auction markets are of two principal kinds: (1) the yards, which include receiving and loading-out chutes, docks and pens, tagging chutes, holding pens, alleys, chutes for feeding the sales ring, catwalks, watering troughs and mangers; and (2) sales barns, which include the sales ring, space for seating buyers, sellers and spectators, auctioneer's box, offices, restaurant or snack bar and scales. The yards and sales barns are connected by alleys or chutes which are used for "feeding" the sales ring and for driving animals to the pens after they are sold.

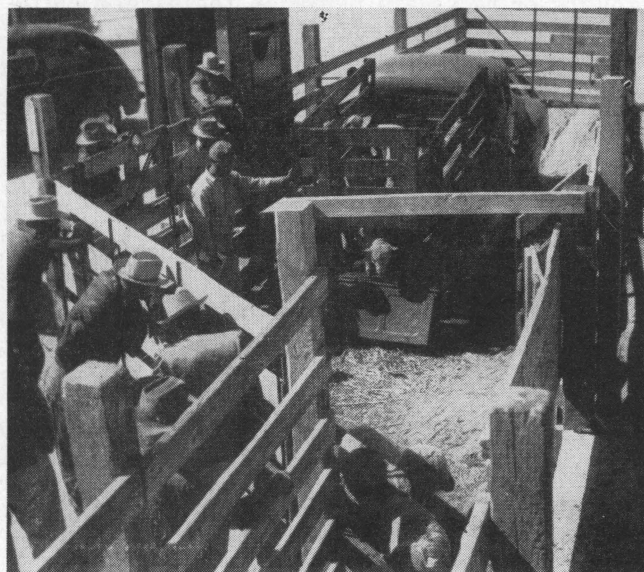


Figure 1. Pens used on some markets for unloading animals from small trucks and automobile trailers.

Market sites range in size from less than an acre to several acres. Many of the markets have sites of inadequate size and, as a result, traffic to and from these markets is congested on sale days, delays occur in unloading and loading out motortrucks and sufficient parking space is not available for buyers and sellers.

Yard Facilities

Receiving and Loading-out Chutes, Docks and Pens

Animals are transported to Texas markets on car trailers, small trucks, straight trucks, and trailer trucks. The volume of livestock received in a few markets by rail from distant points, and on foot from nearby feed lots, is negligible. Facilities used for receiving livestock on small trucks and car trailers are different from those used for receiving livestock in straight and trailer trucks, primarily because of differences in the heights of truckbeds.

Markets located in areas having small farms receive up to 85 percent of their total receipts in car trailers and small trucks. Markets located in ranching areas receive most of their livestock in straight and trailer trucks. Some areas have both small farms and ranches and the proportions received by each type of vehicle varies. All markets, however, should have facilities for receiving animals both on small and large trucks.

Home-made car trailers, used by many producers in hauling livestock to markets, do not conform to any set of standards as to width, length and height of trailer bed, and type of gate lock. Some car trailers are difficult to back against the dock.

On some markets the same chutes are used for unloading and loading out animals. When two separate sets of chutes are used, their design and specifications are similar. The design of facilities used for unloading from and loading out small trucks and trailers represents an effort by management to cope with the problems of vehicles of variable size. For the most part, large trucks do not vary greatly in truck-bed height and the facilities for receiving and loading out this type of vehicle are relatively standardized.

Facilities used with small trucks. Most markets have two or more types of facilities for use in loading and unloading livestock from small trucks and car trailers. These are unloading pens, docks and chutes. Pens used by different markets for unloading livestock vary in size, but generally are at least 12 feet wide and about 40 feet long with a 12-foot gate at each end (Figure 1). A 10-foot gate is located on the inner side near the entrance end of the unloading pen so that livestock may be driven from the pen as soon as they are unloaded. The fence around such pens is usually about 55 or 60 inches high. The

pens have dirt floors and a depression often is made in the ground as a resting place for the rear wheels of the vehicle so that animals can be walked from the bed of the truck onto the ground without a dangerous drop. To unload, small trucks and car trailers enter one end of the pen and leave through the other end. While trucks are unloading, the gates of the pen are closed.

The depression for the rear wheels of the vehicle does not always bring the truckbed flush with the ground and it is frequently necessary for animals to step up 6 to 18 inches when they are being loaded. Since most species of livestock dislike stepping up these heights, pens of this type are rarely used for loading. Markets that use pens for receiving livestock have docks or chutes for loading out. Other markets have docks or chutes for both purposes.

Some markets construct chutes without docks for unloading and loading small trucks. Where docks are constructed connecting with chutes, the docks usually are narrow in depth and about the same width as the chute. Docks or chutes vary in height from about 16 to 30 inches and are constructed to permit either single or multiple unloading (Figure 2). The angles of the chutes vary widely. Although most chutes are at about a 20° angle some are much steeper. Docks or chutes are constructed of concrete or wood. Wooden chutes are usually cleated at 12- or 18-inch intervals with 2 by 4-inch boards. Concrete chutes usually are of rough concrete with grooves at 12 or 18-inch intervals to provide a footing for animals.

The width of chutes varies from about 40 to 60 inches. Difficulty is experienced by some truckers in unloading and loading at chutes of less than 54 inches in width without docks. If the trucks are wider than the chute, it is necessary to stop before reaching the dock to open the end gates. Small trucks unloading and loading at properly designed docks do not have this problem.

Facilities used with large trucks. Although hogs, horses and goats are occasionally hauled on



Figure 2. Chutes used for receiving animals and loading out small trucks and automobile trailers.



Figure 3. Chutes and docks used for receiving animals and loading out large trucks and trailers.

the larger trucks, cattle and sheep are the species usually hauled. Figure 3 shows a dock for unloading and loading out large trucks. Usually several catch pens are located adjacent to the large truck docks for holding animals temporarily. These pens may be used to separate loads of mixed ownership or to hold loads from several trucks prior to movement into the tagging chute. Another use is for holding livestock temporarily before loading out.

Unloading and loading out docks for large trucks are designed to provide space for one or two motortrucks. Very few docks provide space for more than two trucks at one time. In most cases, docks are about 50 inches high and 3 feet in depth. Extension gates are usually hinged to the side of each chute connecting with the docks. These gates are pushed against the sides of the trucks to facilitate the movement of livestock. For use with large trucks, the chutes vary in width from about 40 to 72 inches. Narrow chutes are constructed to decrease the possibility of animals turning around while being unloaded.

The sides of chutes usually are about 50 or 55 inches in height. The angle of chutes varies considerably among markets. The length of most chutes studied was 14 to 16 feet, with about a 20° angle. Chutes of this length and angle appear to be satisfactory. Shorter chutes with a much sharper angle, which were observed on some markets, appeared to be hazardous, although no injuries to livestock were reported. Nearly all chutes are constructed of wood.

On markets which handle sheep, the loading and unloading facilities usually include a chute which extends to the second deck of trucks (Figure 4). This chute is about 78 inches above the ground at the dock end, or about the height of the second truck deck. Sheep chutes are about 32 inches wide with sides about 32 inches in height. The floors of sheep chutes also are ribbed to provide a footing.

The number and size of catch pens used in connection with unloading docks vary among

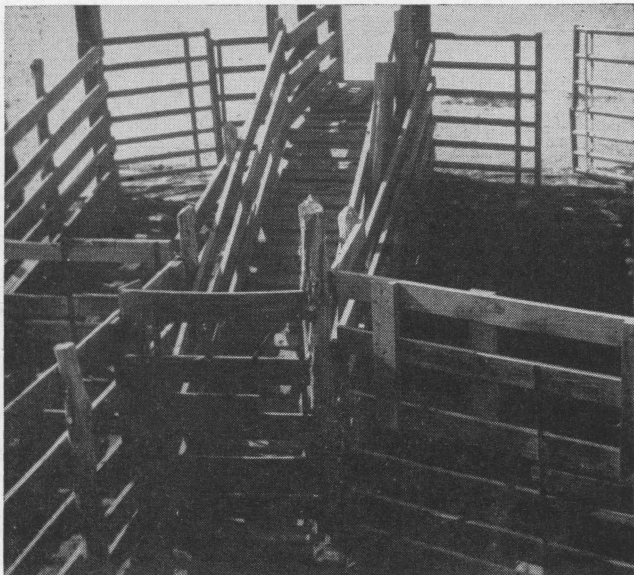


Figure 4. Chutes and docks used for receiving animals and loading out a double-deck truck.

markets. For the most part, these pens are of the same design, height and construction as the holding pens described in a subsequent section. A unique feature of catch pens is that nearly all of them have enough gates to be easily accessible from any direction.

Facilities used with railroad cars. Only a few Texas markets receive livestock by rail and these receive only small proportions of their total volumes by this mode of transportation. However, several Texas markets have facilities for shipping livestock by rail. Figure 5 shows facilities used for loading and unloading railroad cars. Rail shipping docks and chutes are of similar design to those used for large trucks.



Figure 5. Docks and chutes used for loading out railroad cars.

Tagging Chutes

Tagging chutes are used primarily for tagging cattle received by large truck or those arriving before the day of the sale. Cattle arriving by small truck on sales days usually are tagged before unloading. When they arrive on small trucks before the day of the sale, cattle usually are penned prior to tagging. Since it is difficult and often dangerous to tag animals on large trucks or in pens, the purpose of the tagging chute is to confine the animals in a small space so that they can be tagged easily and safely. The tagging chute is generally a part of the dock and holding pen arrangement for unloading large truckloads of cattle.

Tagging chutes usually are 35 to 45 feet long and 25 to 32 inches wide. The sides of the chute frequently are tapered in width from about 32 inches at the top to 20 inches at the bottom. Gates at each end prevent animals from moving forward or backward while the tagging operation is in progress. A typical tagging chute used on Texas markets is shown in Figure 6.

These chutes are usually constructed of 1½ or 2-inch iron pipe, heavy lumber, or a combination of pipe and lumber. In some instances box cars have been converted into tagging chutes. Many of the chutes have rough concrete floors, others have dirt floors. In some instances a small office is constructed adjacent to the tagging chute. The capacity of the chute depends on its length and the size of the animals. Most chutes have space for 6 or 7 cows or 10 to 12 calves.

Holding Pens and Alleys

On most Texas markets, holding pens and alleys of two different designs are used—one for

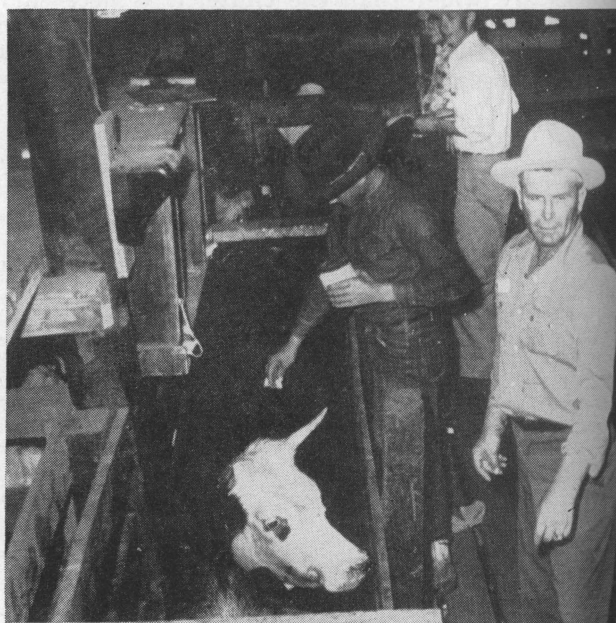


Figure 6. Tagging chute used on livestock auction markets.

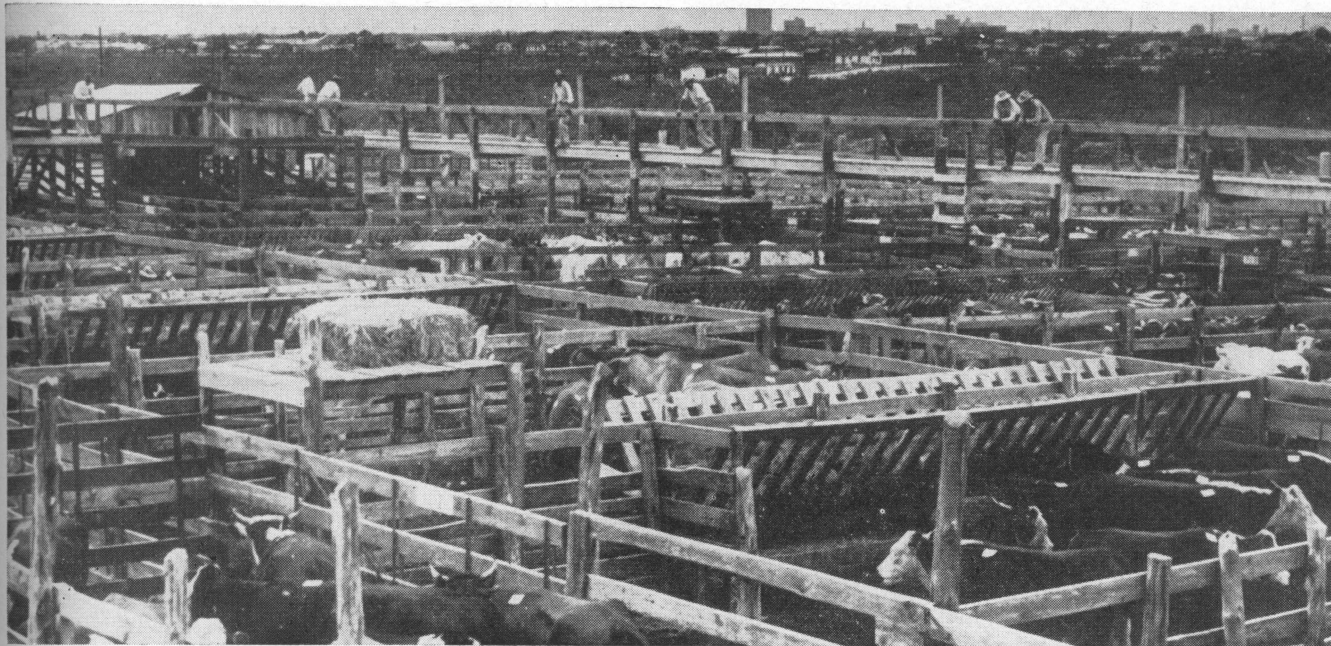


Figure 7. Cattle holding pens and alley on a Texas livestock auction market.

cattle and another for hogs. With the exception of some markets on the Edwards Plateau, which have specially designed sheep pens, sheep are held in the same type pens as used for cattle. The arrangement of holding pens, the relationship of holding pens for cattle to those for hogs and the relationship of both types of pens to the unloading facilities and the sales ring vary considerably among markets.

On most markets, holding pens for cattle are laid out and constructed in long rows on 8, 10 or 12-foot centers, or multiples of these dimensions. Long rows of holding pens usually are separated by alleys of the same dimensions as the width of the pens (Figure 7). Most cattle holding pens are constructed of unfinished 1 by 6-inch boards and cedar posts, and are about 55 to 60 inches in height. Markets that handle relatively large numbers of Brahman cattle usually have holding pens of unfinished 2 by 6-inch boards and often to a height of 7 feet.

While nearly all markets have a few small cattle pens, most of the pens are 10 by 20 feet or larger. Nearly all markets have at least one or two larger pens to accommodate large consignments of cattle. Some markets have individual pens for bulls. These pens usually are 10 by 10 feet or smaller and usually are constructed of 2 by 6-inch or heavier boards. On a few markets 1 by 12-inch boards are attached across the top of these pens to provide catwalks for use by workers in driving bulls out of or into the pens.

Holding pens for hogs usually are located near the sales ring. On most markets, these pens are near the center of the yard layout. On some markets the hog pens are separate from cattle

pens. Other markets locate hog pens as near as possible to the unloading chutes, which usually results in the hog pens being quite a distance from the sales ring. Hog pens and alleys usually are laid out on 4-foot centers. Thus, hog pens usually fall within the following range of sizes: 4 by 4, 4 by 8, 8 by 8 and 8 by 16 feet (Figure 8).

Because of the relatively mild weather, cattle holding pens on Texas markets usually are uncovered, particularly west of the 99th meridian. Markets east of the 99th meridian, in the East Texas and Gulf Coast areas where the rainfall is heavy, usually have covered pens. Most markets in all sections of the State have covered hog pens to reduce the hazard of overheating during summer sales.

Most of the cattle holding pens have dirt floors, but a few have concrete floors. When floors are

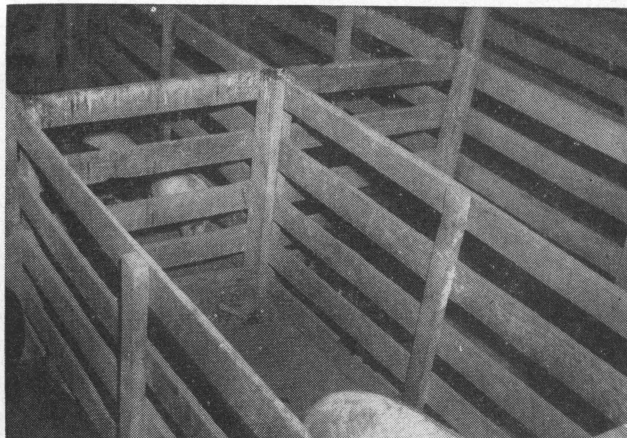


Figure 8. Hog holding pens and alleys on a Texas livestock auction market.



Figure 9. Long, narrow-type chute for driving animals into the sales ring.

constructed of smooth concrete, cattle often slip and bruise or skin their legs. Many hog pens have concrete floors. Most alleys have dirt floors, although a few have concrete floors with a dirt covering.

Of 37 markets surveyed in 1948, only 4 had less than 20,000 square feet of pen space. Five of these markets had 95,000 or more square feet of pen space, while 28 others ranged from 20,000 to 95,000 square feet. Two of the markets had fewer than 20 pens and 8 markets had 120 or more pens. Most markets had from 40 to 100 pens. Since the volume of receipts varies, the amount of pen space on individual markets is usually designed to handle the estimated maximum volume.

Facilities for Driving Livestock into the Ring

Individual markets use different types of facilities to expedite the movement of animals from the seller's pens to the sales ring. The three devices most commonly used are block gates, cutting facilities and feeder chutes.

A series of block gates are used to block alleys so that livestock can be moved in a prede-



Figure 10. Open chute used for driving animals into the sales ring.

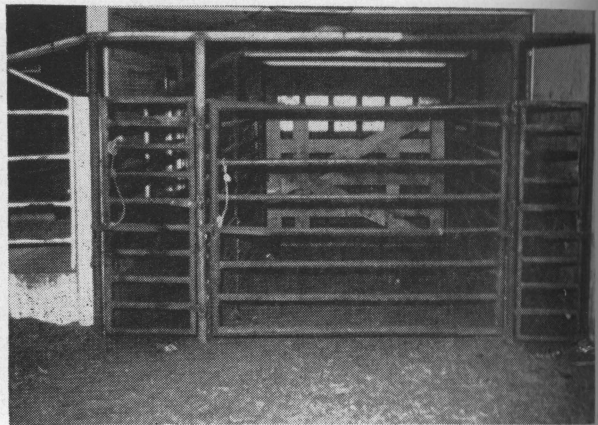


Figure 11. Multiple-type chute used for driving livestock into the sales ring.

termined direction or held in a desired place. Block gates are usually the same width as the alley and the same height as the pens. The number of block gates used varies considerably among markets, depending on the operations performed, the methods used and the personal preferences of the management.

On every market selling groups of animals some cutting or sorting is necessary. Individual markets use different systems in the cutting operation. Some markets sort the animals in the selling pens, some in the "bring-up alley" and others use a specially constructed cutting section located near the sales ring.

Texas markets use three different types of chutes for driving cattle into the sales ring: the open chute, the long, narrow chute and the multiple chute.

On East Texas and the Gulf Coast markets, where most animals are sold singly, the long, narrow chute is used extensively. This chute is usually 50 to 80 feet long and 22 to 30 inches wide (Figure 9). The sides are about 55 inches high. A platform usually is constructed alongside the chute about 24 inches above the ground for use



Figure 12. Catwalks over market yards.

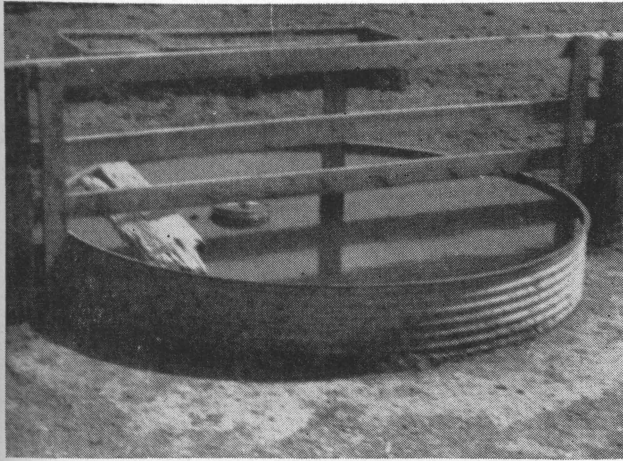


Figure 13. Circular water trough.

by workers who drive the animals into the ring. The chute is fed from a holding pen at the rear and has one exit gate into the ring. Animals are driven into the chute in single file and are kept crowded up by two or more workers who walk up and down the chute platform. A sliding block gate, about 6 feet to the rear of the exit gate to the ring, holds one animal in position to enter the ring. One advantage of this type of chute is that it keeps a relatively large supply of cattle ready to enter the ring and thus reduces delays in the sales operation. Some disadvantages are that several workers are required to keep the animals crowded up to the front of the chute, which excites the animals and causes greater shrinkage; severe bruising often is caused by animals climbing over each other in the chute; and a chute of this type of sufficient width to permit large animals to pass through will not keep calves from turning around.

The open chute in general use on markets in West Texas, where some truck or carload lots of cattle are sold, is merely an extension of the bring-up alley to the sales ring (Figure 10). Block gates are placed in the chute so that single animals or small groups of animals may be kept separate and forced into the ring. This type of chute requires fewer workers for feeding the ring than are required for the long, narrow chute. However, the open chute does not keep a large supply of animals ready to enter the ring and is hazardous to men working in the chute, especially among highly nervous cattle.

A multiple-type chute is used on a number of markets that sell animals both as singles and in groups. It is constructed of pipe, wood, or a combination of pipe and wood. The over-all length is usually about 30 feet and the over-all width about 9 feet. As its name implies, the multiple-type chute consists of two or more chutes or lanes. The design in most common use has a center chute 50 to 60 inches wide, with 22-inch chutes on each side (Figure 11). The entrance end of the chute is equipped with two gates and one door.

When the gates are open and the door closed, animals may be driven into the side chutes. When the gates are closed and the door open, animals may be driven through the middle chute. The chute is so constructed that animals can be held in any one or all three of the lanes or compartments simultaneously. The general practice, however, is to use both side chutes to drive single animals into the sales ring and the center chute to drive groups.

Catwalks

Several Texas markets have catwalks (also known as foot viaducts or footwalks) (Figure 12), to provide a passageway over the pens. A good system of catwalks gives the buyers, sellers and spectators an easy, clean and safe passageway over the pens and an unobstructed view of practically all of the animals in the pens. Markets that do not have catwalks are constantly bothered by spectators and customers walking through the alleys and pens. Supervisory employees often save considerable time and effort by using catwalks to locate market workers and livestock, or to observe the work of individual market employees. Catwalks usually are located over the alleys and are about 6 feet above the top of the pens. They usually are 36 to 42 inches wide with a 2 by 4-inch handrail on each side, about 42 inches high. Steps from the catwalk to the ground are placed at various points to facilitate movement to and from the catwalk.

Water Troughs

Troughs for watering cattle in auctions are either circular (Figure 13) or rectangular (Figure 14). Most water troughs are constructed of

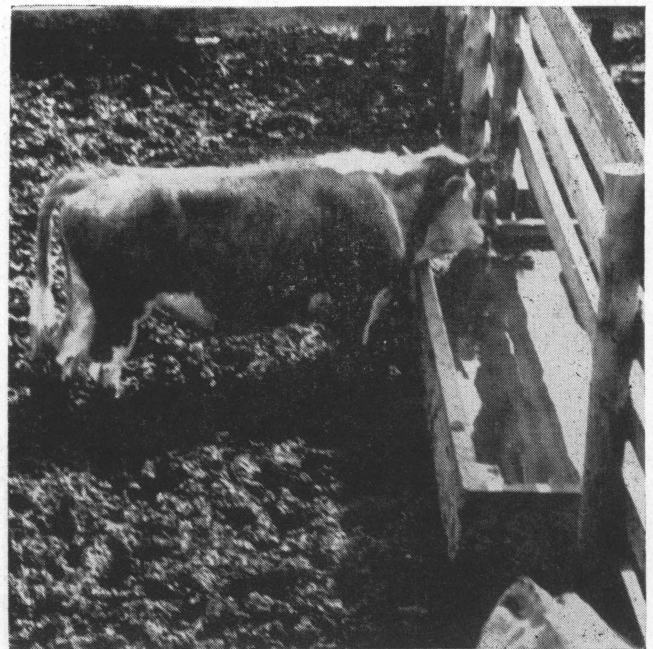


Figure 14. Rectangular water trough.

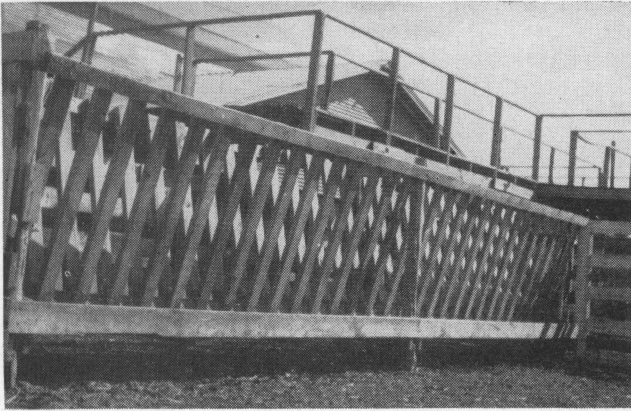


Figure 15. Hay rack.

concrete or metal. Hog troughs usually are rectangular and are constructed of wood, metal or concrete.

Hay Racks and Grain Troughs

Feeding policies vary between markets in much the same manner as watering policies. Some markets provide feeding facilities in buyers' pens, some in sellers' pens, a few in both buyers' and sellers' pens, and many in neither. As a general rule, pens having feeding facilities also have water available.

Feeding facilities are of three general types: hay rack (Figure 15), grain troughs (Figure 16), or a hay rack and grain trough combined (Figure 17). Markets attempt to furnish the kind of feed the consignor wants, provided it is available. Some markets build platforms at intervals among the pens to provide feed storage at convenient points before the day of the sale (Figure 18). This practice permits animals to be fed on sales day without the necessity for hauling feed through the alleys.



Figure 16. Grain trough.

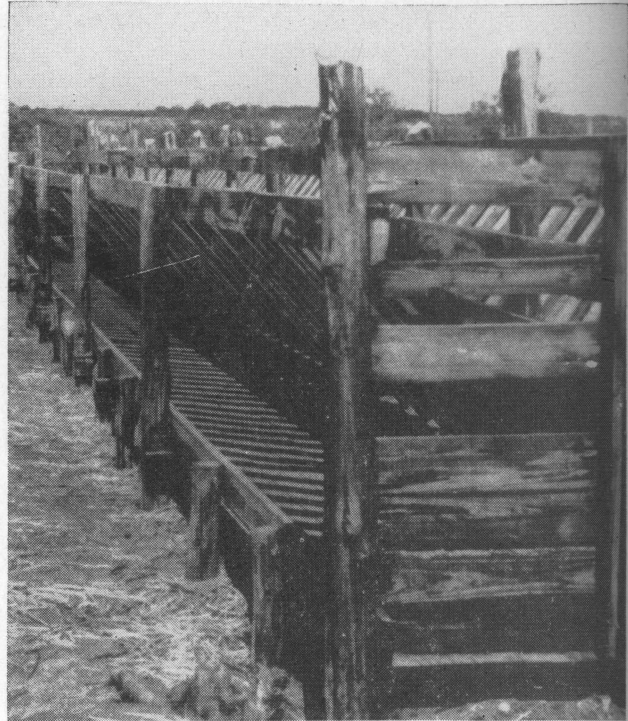


Figure 17. Combination hay rack and grain trough.

Yard Lights

Lighting facilities on the yards are of two types. One type includes flood lights on tall posts at intervals in the yard. This type provides excellent visibility. The other type includes frequent bare bulbs strung on wires at about catwalk height. This type is less effective because the lower height and lower wattage illuminate less completely.

Arrangement of Yards

One of the principal defects of Texas livestock auction markets is the poor arrangement

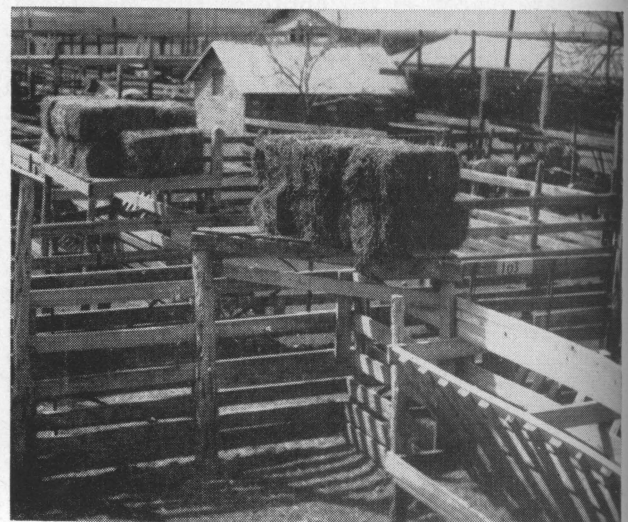


Figure 18. Platform for temporary storage of feed.

of their yards, which results in a cross flow of traffic, causes delays in the movement of animals, and necessitates relatively long drives. A poor arrangement increases the labor required for performing the various handling operations and slows the rates of their sales. Most of the markets began operating with a relatively small number of pens and alleys and increased the size of their yards as the volume of livestock handled increased. Pens usually were added wherever space was available, with little or no consideration of the flow problems that would result.

The movement of livestock through an auction market facility involves three separate cycles of operations: receiving, selling and loading out. On most markets, at least two of these cycles are performed concurrently. For short periods all three cycles frequently are performed simultaneously. To illustrate, most markets continue to receive consignments throughout the sales period, when animals are being brought up to the sales ring and are being driven from the ring to the buyers' pens. Depending in part on the length of the sale, some buyers begin loading out before

the sale has been completed. However, most loading out is done after the end of the sale.

If these cycles of operations were performed one at a time there would be no particular problem on most markets with the cross flow of traffic, delays, mixing of lots and strays. There would, of course, still be a problem on some of the larger markets with long drives. Such drives require many workers and an elaborate series of block gates to maintain a steady flow of animals into the ring. Since the volume moved is of primary importance to market operators, it would be impractical to complete one cycle of operations before beginning another. Such a practice would require a substantial increase in the amount of facilities required for handling a given volume and might offset savings in labor.

Figure 19 shows the yards layout of one of the better livestock auction market facilities in Texas. Although a number of Texas markets have yards with more serious defects than the one shown, these defects are applicable to the yards on most of the markets in the State.

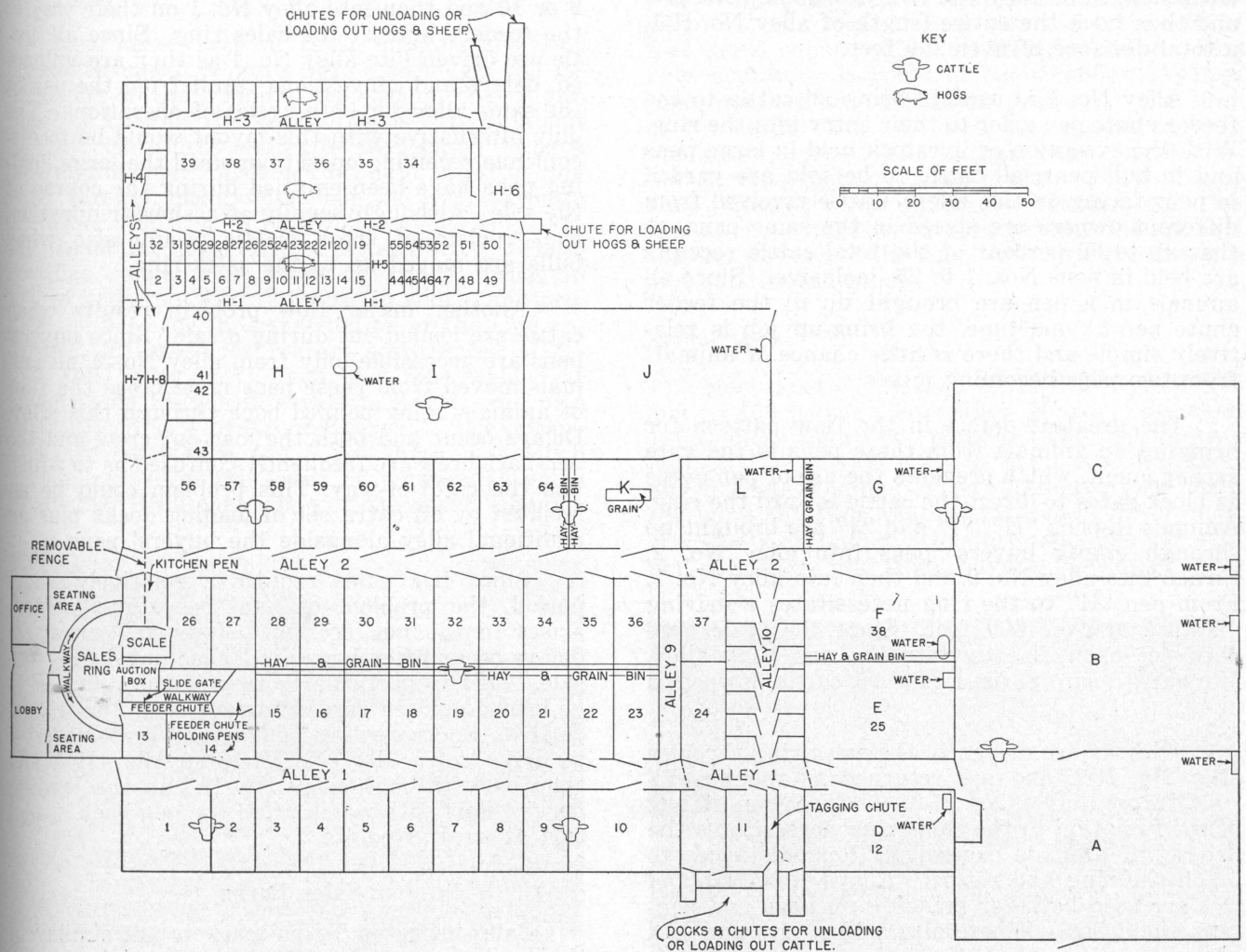


Figure 19. Layout of the yards on a Texas livestock auction market.

On this market, receiving operations begin on the day before the sale with the arrival of consignments from relatively long distances. Cattle are unloaded and penned in one of the large holding pens at the rear of the market or between the cattle buyer pens and the hog pens. Consignments arriving on the day of the sale are penned in the seller pens adjoining alley No. 1. When receiving operations are performed without interference from other operations, the only congested point is at the tagging chute which, because of its location, can be used only when there is a lull in unloading.

Generally very few hogs are received before the day of the sale. Two unloading docks are provided for hogs — one for large trucks and the other for pickup trucks. From these docks, hogs are driven into alleys Nos. H-2 or H-3. Hog pens open onto only one alley and the gates facing these alleys are hung so that hogs must be driven past the pen, the gates opened and the animals then driven back into the holding pen. Although pen No. 49 is only 50 feet from the unloading docks, to pen animals in this pen, it is necessary, because of the gate arrangement, to drive the hogs the entire length of alley No. H-2, down alley No. H-4 and then back the entire length of alley No. H-1, a total distance of over 250 feet.

Alley No. 1 is used to bring all cattle to the feeder chute pen prior to their entry into the ring. With the exception of livestock held in large pens and in bull pens, all cattle to be sold are yarded in pens facing on this alley. Cattle received from different owners are placed in the same pens, so that up to 80 percent of the total cattle receipts are held in pens Nos. 1 to 25, inclusive. Since all animals in a pen are brought up to the feeder chute pen at one time, the bring-up job is relatively simple and there is little chance of animals from two pens becoming mixed.

The greatest defect in the flow pattern for bringing up animals from these pens is the gate arrangement, which prevents the use of pen gates as block gates to direct the cattle toward the ring. Animals in pens "H", "I" and "J" are brought up through empty buyers' pens into alley No. 2, turned into alley No. 9 and then into alley No. 1. From pen "H" to the ring necessitates a driving distance of over 300 feet. Since the scale gate does not open directly into the pen back alley, two extra men are used to start cattle down this alley.

All hogs are driven to the sales ring through alley No. H-7, and are returned to the buyers' pens through alley No. H-8. The location of hog pens in relation to the sales ring necessitates the driving of animals excessively long distances to reach the ring and return. Alleys Nos. H-1 and H-4 are used both for bringing up hogs and penning them back. Where alleys Nos. H-2 and H-4 converge, minor congestion is created by the traffic to and from the sales ring. At the intersec-

tion of alleys Nos. H-1, H-4, H-7 and H-8, where there is a heavy volume of traffic traveling in all directions, congestion is created and a great deal of extra manpower is required to drive the hogs and to keep groups from becoming mixed. These animals are not tagged and it is essential that each lot be kept separate.

After the sale, the loading out operations begin with a crew checking cattle by purchaser and purchaser accounts. Animals are then moved by load-out crews from buyers' pens into alley No. 2 to alleys Nos. 9 and 10 and through one of these alleys into the loading pens. Since several crews are working at once, congestion occurs where alleys Nos. 9 and 10 intersect alleys Nos. 1 and 2. The major difficulty in loading out hogs is that animals yarded in pens along alley No. H-1 and in pens Nos. 40-43 are required to travel excessive distances to the loading docks.

One of the major flow problems arises when cattle receiving and selling operations are performed at the same time. Cattle held in the large pens are sold first, which means that animals held in pen C and pens G through L have to be moved across alley No. 2, down either alley No. 9 or 10 and then into alley No. 1 on their way to the feeder chute at the sales ring. Since all cattle are driven into alley No. 1 as they are unloaded, delays and congestions result from the use of the same alley for both cycles of operations. The only alternative with this layout would be to discontinue receiving operations until the large holding pens have been emptied during the course of the sale. Although usually of a shorter duration, the problem of cross traffic occurs also when bulls are moved up to the sales ring.

Another major flow problem results when cattle are loaded out during a sale. Since buyers' pens are accessible only from alley No. 2, all animals moved from these pens must cross the flow of animals being penned back through this alley. Delays occur and both the load-out crew and the pen-back crew are frequently confused as to which has the right-of-way. This problem could be alleviated by an extra set of loading docks plus an additional alley alongside the buyers' pens.

Since hog sales require a relatively short period, the problem of dual operations seldom arises in the hog section. However, occasional delays occur when hogs are loaded out during the sale. This is particularly true if the animals to be loaded out are yarded in pens Nos. 2 to 49, inclusive. Such yarding causes the load-out crew to drive down alley No. H-1, up alley H-4 and then back through alley No. H-2 to the loading docks. This path would cross the pen-back operation at several points.

Sales Barns

Sales barns on Texas markets are similar in their components but they vary widely in design and dimensions. Sales barns include the sales

ring, seating area, auctioneer's box, office and usually a restaurant. Many sales barns are constructed without adequate windows for natural light and are dark and gloomy when not lighted artificially. Market owners construct barns in this manner because they prefer to sell livestock under artificial lights. In a few small sales barns, only natural light is used for the ring during daylight hours.

The entrances and exits of nearly all sales barns are at ground level, with the main entrance at the front and center of the building. Smaller entrances usually are located on each side of the seating area. The market office usually is located at the front of the sales barn on one side of the main entrance. The other side is frequently used for a restaurant.

Sales barns and sales rings are lighted by a variety of equipment. Usually the sales ring is well lighted while the seating area is provided with only a few lights so as to focus the full effect of the lights on the livestock in the ring.

Sales Rings

Most sales rings on Texas markets are U or crescent-shaped (Figure 20). Although the dimensions of these rings vary widely, the "diameter" or base of the semi-circle is usually about 32 feet. Entrances and exits are located on each side of the ring. Livestock brought into the ring enter through one gate or door and leave through the other. Most sales rings have a concrete footing around the outer edge of the semi-circle. These footings range from about 18 to 24 inches in height and from 8 to 12 inches in width, and provide the base for the construction of the ring enclosure. These enclosures are constructed of $\frac{3}{4}$ -inch steel bars or $1\frac{1}{4}$ -inch iron pipe welded at about 12 or 18-inch intervals to 3-inch iron pipe posts placed at 4 to 6-foot intervals. The enclosures are between 6 and 8 feet high, but much higher enclosures are found on markets in areas producing Brahman cattle. The most common

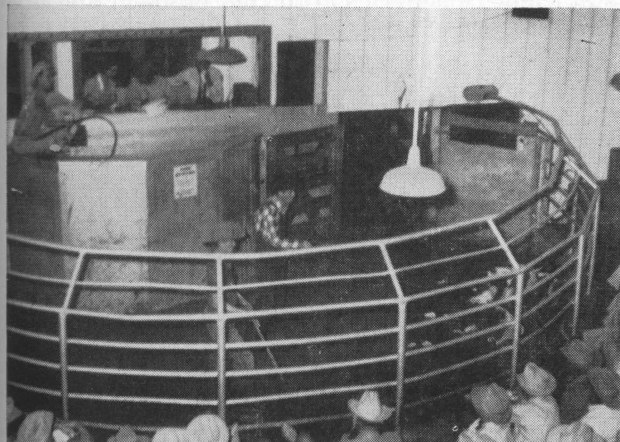


Figure 20. U-shaped sales ring.

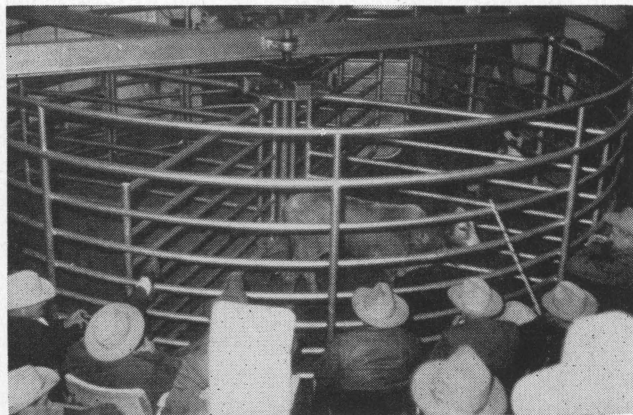


Figure 21. Mechanical sales ring.

size rings consist of 300 to 500 square feet of space.

Two other types of sales rings used on a few Texas markets are the mechanical ring (Figure 21) and the straightaway ring (Figure 22). The mechanical ring is a circular structure having a diameter of about 25 feet. The ring is divided into four equal parts by gates which are attached to a center post. These gates operate with a belt drive connected to an electric motor. The ring enclosure is constructed of about $1\frac{1}{2}$ -inch pipe attached to 3-inch iron posts. At the time of the study, this type ring was in use on only one Texas market. The straightaway ring is similar in construction to the crescent or U-shaped ring. The primary difference between the two is that the straightaway ring permits the animals to enter one end of the ring, walk straight through and out the other side.

Seating Area

Most auction market barns have seats for 200 to 400 people. The range is from less than 100 to more than 1,000 persons. The seating area borders the outside edge of the sales ring. Usually a small number of more comfortable seats surround the ring and are reserved for the buyers. Seats at higher levels are available for sellers, spectators and small buyers. Although some

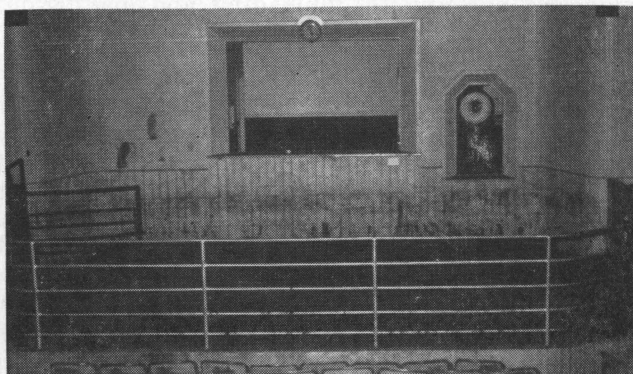


Figure 22. Straightaway sales ring.



Figure 23. Office on a Texas livestock auction market. A pneumatic tube is used to bring sales tickets into the office from auctioneer's box.

sales barns have only one entrance, most barns have two side entrances and a middle entrance that can be used to reach the seats. The turnover of spectators and consignors during a sale usually is high. Part of the seating capacity frequently is unused because spectators gather around and partially block the entrances.

Auctioneer's Box

The auctioneer's box usually is located across the sales ring from the seating area and between the entrances to the ring (Figure 20). The counter of the box is about 7 feet above the floor of the ring. Usually the auctioneer's box affords a seat for the auctioneer, two or more of the clerical staff and frequently the weigher and starter.

Office Space

Market offices vary considerably in size and furnishings. Most offices have adequate space for seating 6 to 10 employees (Figure 23). A few markets have comfortable and well-furnished offices, while others are extremely plain and have little office equipment. The location of the office is of major importance due to the constant flow of papers during a sale between the office, auctioneer's box and the unloading and loading-out platforms.

Scales

With the exception of a few comparatively small markets, all Texas auction markets have at least one set of scales and some of the larger markets have two sets. Markets having only one set locate the scale platform adjacent to the exit from the sales ring. The scale beam usually is located in the auction box. In some instances the beam is located to the rear of or a short distance from the auction box. All animals sold by weight, and some of those sold by the head, are weighed as they leave the ring. Markets that have two

sets of scales usually locate the second set in the yards. This set is used to weigh animals when transactions are made on the yard or for reweighing animals sold in the ring when a buyer or seller demands a reweigh.

Nearly all the scale beams are so arranged that the weigher faces the beam and the scale platform when performing the weighing operation. The design or construction of the auction box or the arrangement of the scale beam in the box sometimes prevents the weigher from having a clear view of both the drive-on and drive-off ends of the scale platform at the same time. In some cases, particularly when the scale beam is located to the rear of the auction box, buyers and sellers are unable to observe the weight determinations and recordings.

Scale platforms and racks on Texas markets vary considerably in size and sometimes in design. In the markets studied, the widths of the platforms varied from 7 to 9 feet and the depth ranged from 9 to 16 feet. Scales with too large a platform and too great a weighing capacity are generally unsuited for rapid and efficient weighing of the single animals and small lots which characterize Texas auction markets.

Scales usually are the weigh-beam or the automatic-indicating type with a 5-pound minimum graduation. A large number of scales are equipped with printing attachments. Most weigh-beam type scales are equipped with balance indicators. Scale weighing capacities range from 5,000 to 20,000 pounds. The scale in most common use has a weighing capacity of 10,000 pounds.

Toilet Facilities

On most markets, toilet facilities are provided in the sales barn. Only a few markets provide no toilet facilities.

Market Sites, Roads and Parking Areas

Another major defect of many Texas markets is their inadequate arrangement for parking motor vehicles. Very few markets have given sufficient consideration to this problem and pres-



Figure 24. Cars of market patrons parked along a public highway because of inadequate parking space on the market.

ent facilities vary from fair to very poor. On some markets, insufficient space is available, on others, the available parking space is not properly utilized. The policy of unregulated parking results in a confused jumble of cars, large trucks, trailers and pickup trucks; and it is often very difficult for vehicles to reach the loading and unloading docks. On markets where the site is too small to afford adequate parking space for buyers, sellers and spectators, vehicles are parked alongside the highways, thus creating a traffic hazard (Figure 24).

In some cases, cities and towns have grown until they now surround the markets, which originally were on the border or just outside the corporate limits. In such cases, traffic to and from the markets mingles with other traffic and delays are caused. Areas for backing trucks sometime include city streets and highways. Any expansion by such markets would be expensive since adjacent property has increased appreciably in value.

Several markets, particularly those constructed recently, are located on sites ranging from 300 feet to almost 2 miles from major highways and sufficiently far from town to avoid traffic congestion. (See the illustration on the front cover page.) These markets contain ample parking space and room for expansion but usually have no parking plan.

MOVING LIVESTOCK THROUGH AUCTION MARKETS

Although no equipment is needed, considerable labor is required for performing the physical handling operations on livestock auction markets. The methods used and the consequent amounts of labor required for performing specific operations are, among other factors, influenced by the layout and design of the facilities, and the fact that, in conducting sales, speed, rather than efficiency, is of primary importance to market operators whose revenues are in direct ratio to the number of livestock sold. Improved market facilities in a number of areas have shown the possibility of increasing both the speed and the efficiency with which these operations are performed.

The high degree of similarity in the physical handling operations performed on Texas markets makes it possible, for purposes of this analysis, to group them into the three cycles of operations: receiving livestock, selling livestock and loading out livestock.

Methods studies made on selected markets show a high degree of variation in the skill and effort of workers employed to perform the physical handling operations. The rapid turnover of market workers added to this variability. Individual animals are unpredictable and may react differently in comparable situations. Therefore, time study data on specific methods which are

presented in the following sections should be used only as a general guide to labor and time requirements.

Since cattle are the predominant species of livestock sold on Texas markets, the time study data presented are confined primarily to the operations performed in the handling of this species. Although hogs are sold in a relatively large number of markets, the volumes handled are comparatively small and on most markets hog sales rarely require more than an hour. Consequently, time study data are included only for specified hog operations. Since sheep are of major importance to only a few markets and usually are sold through facilities designed for cattle, time study data on the sale of sheep are omitted.

Receiving Livestock

As previously pointed out, Texas auction markets receive livestock arriving by pickup trucks and car trailers at facilities of one design and those arriving by straight trucks and trailer trucks at facilities of another design. Usually the methods employed in receiving livestock by small trucks also are different from those used in receiving livestock arriving by the large trucks. Thus, the analysis of the methods and facilities used in receiving livestock is based on the size of the truck.

Receiving from Small Trucks

The cycle of operations performed in receiving livestock from small trucks is: (1) preparing the receiving ticket, (2) tagging the animals, (3) unloading and (4) driving them into the assigned holding pens. The flow diagram of the receiving operations on a typical market is shown in Figure 25.

The size of loads of livestock received by small trucks is extremely variable. Generally, loads range from 1 to 6 cattle, 1 to 10 hogs or 1 to 30 sheep. Most livestock brought to the markets on small trucks arrive on the day of the sale, but there is considerable variation among markets as to the peak period of arrivals. Although trucks begin to arrive early in the morning and reach a peak before noon at most markets, the small truck line is sometimes rather long when the sale begins. Livestock on small trucks waiting in line to unload are subject to weather hazards, including shrinkage and even death losses during hot weather. These small consignors also are potential buyers and it is poor business to keep them waiting in line because of inadequate receiving methods. Most markets try to unload livestock arriving by small trucks as quickly as possible.

Receiving operations are performed by six to eight workers. One worker is assigned the responsibility for preparing the receiving ticket, one worker tags the animals, two to four workers unload the truck and two men drive livestock

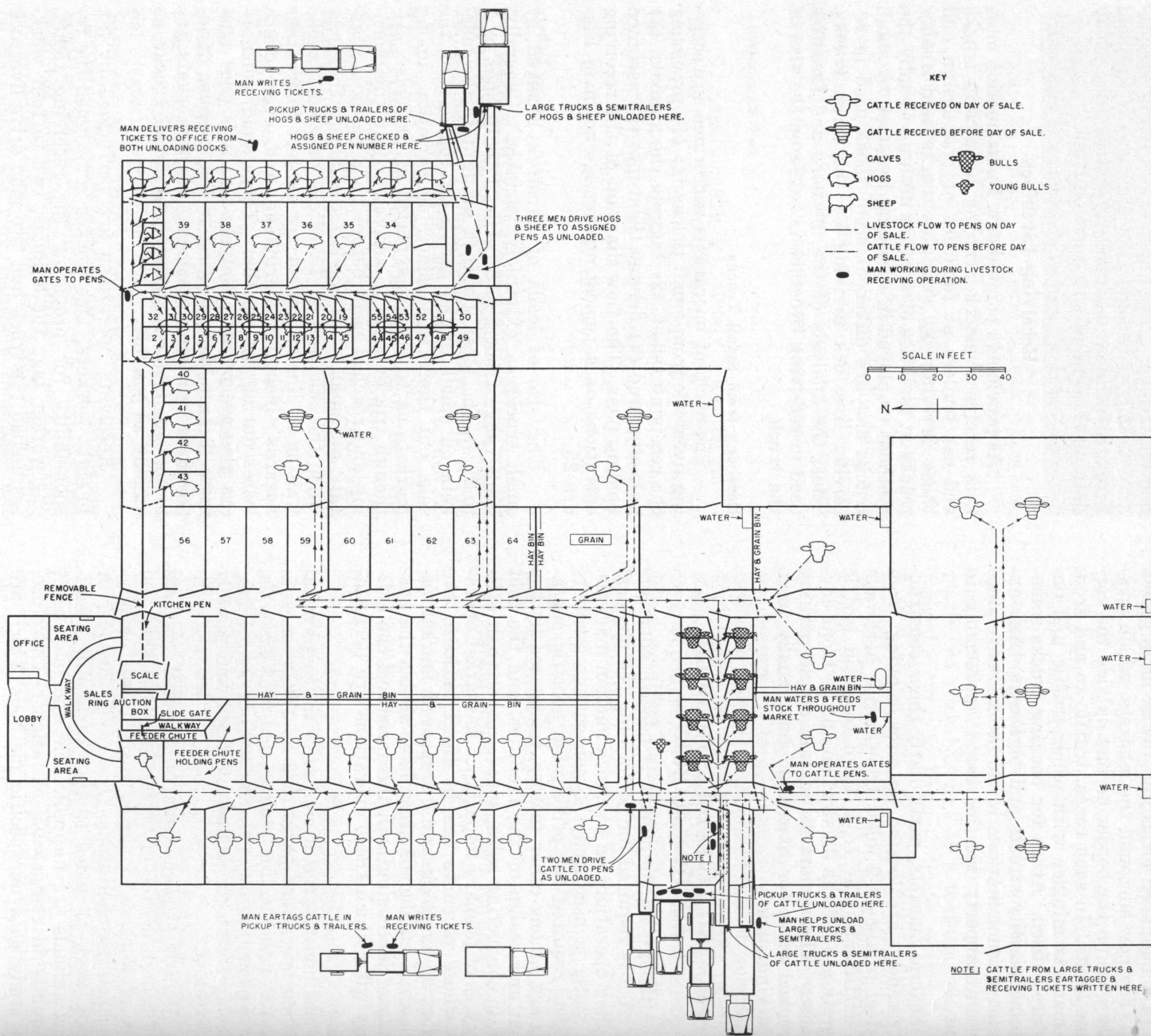


Figure 25. Flow diagram of the receiving operations on a typical market.

to the holding pens. Usually members of the crew interchange jobs to maintain flexibility of operations. At least two different methods are used for receiving livestock. In the first method, all operations in the cycle are performed simultaneously. With the second method, the tagman operates independently of the rest of the workers.

Preparing the receiving ticket. In preparing the receiving ticket, one crew member obtains and records: (1) the name and address of the con-

signor; (2) the license number of his truck; (3) the number of the tag placed on each animal; and (4) a description of the animals, selling instructions if any, watering and feeding instructions, and arrangements for the disposal of the check. Separate receiving tickets are prepared for hogs, sheep, bulls, milk cows and calves, and other cattle and calves. Separation of receiving tickets by species of livestock is intended to expedite the completion of office procedures. An analysis of office procedure, which was not included in this

study, would be necessary to determine the most efficient type of receiving ticket.

When the "write-up man" is located at the unloading pen and all receiving operations are performed simultaneously, the time required to prepare a receiving ticket for a truckload of cattle averages about 1.8 minutes. Of this time, an average of about 0.5 minute is spent attracting the attention of the driver, obtaining his license numbers and asking for a repeat on tag numbers or description of the animals.

When the "write-up man" operates independently of other crew members and prepares the receiving ticket outside the unloading pen or along the small truck line, the operation averages 1.2 minutes. About 0.2 minute of this time is spent in moving from one truck to another. This method permits the write-up man to attract the driver's attention quickly, to obtain the license number while approaching the vehicle and to maintain closer contact with the tag man.

Tagging the livestock. All cattle arriving by small trucks are tagged as they are received. The tagging operation is important because each animal is identified by the number on its tag as long as it remains on the market. Tags must be fastened securely to the animal since several operations may be delayed if any animal cannot be identified immediately.

Glue tags and ear tags are used on Texas markets. Glue tags usually are of medium weight paper about 2 by 4 inches in size with numbers on one side. Glue is smeared on the back of the tag just before it is placed on the animal. Most markets prefer to use two tags, with identical numbers, for each animal so that if one tag comes loose the animal still can be identified.

While the truck is in the unloading pen and all receiving operations are being performed simultaneously, the average time required to perform the glue tagging operation is approximately 0.8 minute for a load of cattle or hogs. When the tagging operation is performed in the unloading pen, the worker takes two tags; places glue on them with a stick, brush or perforated container; steps up on the truck and places a tag on each side, shoulder or hip of the animal. Occasionally, one worker places glue on the tags and another places the tags on the animal. The time of only one worker is included in the time shown for the operation since it can be performed easily by him. When one worker moves down a waiting line of small trucks tagging cattle, the average time required to perform the glue tagging operation is about 0.5 minute.

Ear tags usually are of heavy paper or cardboard and most of those observed were about 2 by 2 inches or larger. Identical numbers are shown on each side of the tag. These tags are fastened to one ear of each animal with a metal clip by the use of a hand stapler. When the tag-

ger is working along the small truck waiting line, the average time required to place ear tags on a truckload of cattle is about the same as that required for glue tagging. No time studies were made of the ear tagging operation being performed in the unloading pen.

Since each owner's hogs usually are yarded in a separate holding pen, a number of markets do not tag hogs. Markets that do not tag hogs apparently performed all selling operations just as quickly, and with as few errors, as the markets that do tag.

Unloading animals. When small trucks are unloaded in pens, two workers perform this operation simultaneously with the performance of the write-up and tagging operations. Frequently, these two workers are assisted part or full-time by other laborers. For pen unloading operations, the average time required for either cattle or hogs is about 2.8 minutes. The removal of animals from trucks comprises only a fractional part of the total unloading time, regardless of the number of head unloaded. Based on this time, small trucks are unloaded at a rate of about 22 per hour.

In an effort to increase the rate of unloading operations, two revised methods for receiving cattle from small trucks were tested. These involved a separation of the tagging and ticket preparation operations from the unloading operation.

In the first method, four employees were used to perform unloading operations. One worker's only duty was to open and close the entrance gate to the unloading pen. The other three men worked exclusively on unloading the animals from the truck and preparing the truck to drive off. The average elapsed time required per truckload under these conditions was about 1.2 minutes. Thus, by separating the tagging and ticket preparation operations from the unloading operation and adding two workers to the receiving crew, the unloading pen handled trucks at a rate of 47 per hour, or about twice as many per hour as are unloaded when the tagging and write-up operations were performed simultaneously with the unloading operation. Although this method was not tested for unloading hogs, a proportionate increase should result in the rate of unloading this species.

In the second revised method, three market employees performed the unloading operation at the docks. All observations of unloading were made when the tagging and ticket preparation operations were performed away from the dock. The average time required to unload was 2.0 minutes, or at the rate of 30 trucks per hour. The primary difference in the time required to unload small trucks at the dock and in the unloading pen, when tagging and ticket preparation are separated from the unloading operations, is in the time required for one truck to leave the unloading facility and another to move in. This time averaged

about 0.8 minute, as compared with an average of about 0.2 minute for a small truck to drive out of the unloading pen and another to drive in and stop. A comparison of the labor required per small truckload of cattle for performing these operations by use of the three methods is shown in Table 1.

Table 1. Comparative labor requirements per small truck for unloading, preparing ticket and tagging cattle by use of 3 specified methods on Texas auction markets

Method	Men in crew	Average elapsed time per truck	Total labor requirement per truck	Write-up and tagging labor requirement per truck	Total write-up, tagging and unloading labor requirement per truck
	No.	Minutes	Man-minutes	Man-minutes	Man-minutes
Performing all operations in the unloading pen	4 ¹	2.8	11.2	—	11.2
Performing the write-up and tagging outside the pen followed by unloading in the pen	4 ²	1.2	4.8	1.7	6.5
Performing the write-up and tagging away from the dock followed by unloading at the dock	3	2.0	6.0	1.7	7.7

¹The write-up man and tagman are included in this crew.

²One man devotes his time to opening and closing the entrance gate to the unloading pen.

Driving animals to holding pens. Because of the difficulty of identifying and separating hogs, each consignor's hogs are assigned a separate holding pen. On most markets, bulls also are placed in individual pens. This practice makes it necessary to drive hogs and bulls directly to the assigned holding pens as they are unloaded.

Cattle are driven by two methods from the unloading pen or docks to holding pens. One is to drive each load to the holding pen as soon as it is unloaded. The other method is to drive each load into a holding or catch pen located near the unloading facilities. When this pen has been filled, cattle are driven to the holding pen assigned to the seller. This is referred to as the "catch-pen method."

By the first method, two workers usually drive each load of cattle to the assigned holding pen. One worker drives the animals from the unloading facility to the holding pen and the other man is stationed in the alley near the seller's holding pens to open and close the gate of the assigned pen. The average elapsed time required by this method to drive a truckload of livestock to holding pens located approximately 100 feet from the unloading facility is about 0.7 minute for cattle and 1.2 minutes for hogs. Total labor requirements were 1.4 man-minutes to pen a load of cattle and 2.4 man-minutes to pen a load of hogs.

A two-man crew also is employed for penning cattle by the catch-pen method. The catch pens into which cattle are first driven are usually about 15 or 20 feet from the place where cattle are unloaded. Normally two catch pens are

used, and one worker is stationed at the gate of each pen. These workers open and close the gates as the animals are driven into the pens by the unloading crew. The average time required to pen a truckload of cattle by this method is about 0.15 minute per load. Catch pens usually have space for an average of 14 small truckloads of cows and calves. Thus, the average elapsed time required to fill a pen is 2.1 minute (plus wait time). Since only one man per pen is charged to this operation, the labor requirements would be 2.1 man-minutes. After the pen has been filled, the gate-man, with the aid of an alleyman, moves the animals to the assigned holding pens. The average elapsed time required to remove 30 to 45 cattle from the catch pen and drive them to a holding pen is about 1.5 minutes. Thus, the total labor requirements for performing the operation by this method is 3.0 man-minutes. The total labor requirements for driving the equivalent of 14 small truckloads of cattle to the holding pen to which they are assigned by this method is 5.1 man-minutes (plus wait time), as compared with 19.6 man-minutes when each load is driven to the assigned holding pen as it is unloaded.

Receiving from Large Trucks

Nearly all Texas markets have docks of similar design for receiving livestock arriving by large trucks. The number of catch pens at the docks varies considerably among markets, and some markets do not have a tagging chute. The use of tagging chutes and catch pens on individual markets depends on the volume of business received by large trucks. Markets in small farm areas usually receive most of their business by small trucks. These markets may not receive more than 10 loads of livestock by large trucks on sales days and need only one or two pens at the dock for unloading purposes. They do not use tagging chutes in connection with receiving operations.

Markets that receive comparatively few loads of cattle by large trucks usually do not have an organized crew for these operations, but depend primarily on workers assigned to other jobs to receive them from this type vehicle. Therefore, the methods presented for receiving livestock by large trucks are primarily those in use on markets where a comparatively large volume of the business is received in this way.

The cycle of operations performed in receiving cattle from large trucks are: (1) preparing the receiving ticket; (2) unloading; (3) separating cattle by ownership; (4) driving cattle into the tagging chute; (5) tagging cattle; (6) preparing the consignor's form; and (7) driving animals to assigned holding pens.

Preparing the receiving ticket. One worker is assigned to prepare the ticket and receive cattle arriving by large trucks. The preparation of this ticket is related closely to the unloading

operation and the time required to complete the ticket, to some extent, is controlled by the time required to unload. The worker preparing the receiving ticket usually determines the kind of truck and records this information and its license number as it backs up to the dock or the unloading chute. The name of the seller is usually obtained from the driver after he walks back to the tailgate of his truck. The number of animals also may be obtained at this time, if the load of cattle is one that can be counted easily. If not, cattle are counted as they walk from the truck down the chute. On some markets, the count may not be made until the animals are in the holding pens. During the time the cattle are being unloaded, the truck driver or owner provides the ticket writer with instructions, if any, regarding the selling, penning and feeding of the animals. The truck driver, who may also be the consignor, is then asked to sign the receiving ticket. One copy of the receiving ticket is given to the driver, one copy is given to the worker who prepares the consignor's sheet at the tagging chute and the third is forwarded to the market office. Although the time required to prepare receiving tickets varies widely, the average time required by one worker per large truckload is about 4 minutes.

Unloading cattle. Unloading cattle from large trucks is not a difficult operation and normally the markets do not provide workers for this task. In the unloading operation, the driver backs his truck to the platform of the unloading chute and then goes to the rear of the truck, fastens the extension gates of the unloading chute to the truck, opens the tailgate of the truck and drives the animals down the chute. Although the driver rarely removes more than one tailgate of his truck when unloading cattle, with large loads it is often necessary to remove partitions within the truck. These partitions are inserted at loading time to minimize the slipping and crowding of cattle caused by sudden stops and lurches of the truck. If necessary, the driver is assisted in removing animals from the truck by the write-up man or other market employees.

The average elapsed time required to unload large truckloads of cattle, regardless of the size of the load, is about 7 minutes. The number of head unloaded has relatively little effect on the unloading time. Since large trucks remain at the dock for about 7 minutes, the maximum number of large trucks that can be accommodated at one dock is 8 per hour.

Separating cattle by ownership. A large truckload of cattle owned by two or more persons is unloaded into a catch pen and is sorted by ownership prior to tagging. Mixed ownership loads are relatively rare and this operation is performed rather infrequently. Such loads often arrive during the peak unloading period and may tie up the docks for several minutes if enough catch pens are not available. The sorting operation may be performed by the driver of the truck, the ticket

writer or other market employees. No time study was made of this operation because of the variation in the size of the loads, the number of different owners and the number of cattle owned by each person. Since market employees seldom perform this operation, the market is chiefly interested in determining the need for facilities rather than labor requirements. However, the method of performing the task was observed and its importance in designing more efficient facilities will be discussed later in this publication.

Driving cattle into the tagging chute. Before they are driven into the tagging chute, cattle usually are held in a specially designed pen adjacent to the chute.

Two workers drive cattle into the chute where they are tagged and the consignor's sheet is completed. Figure 26 shows cattle being driven from a specially designed catch pen into the tagging chute. The number of cattle consigned to markets for sale by individual owners ranges from one or two to more than 100 head. The number of animals the tagging chutes will hold depends on their length and the size of the animals. Generally, tagging chutes contain space for 10 to 15 calves or 6 to 10 cows. Consequently, animals are driven into the tagging chutes in these size lots. Since cattle are numbered consecutively by ownership in order of their arrival, it usually is the responsibility of the two workers who drive cattle into the chute to notify the tagger and the worker preparing the consignor's sheet when the last animal of each owner's lot enters the tagging chute.

Driving animals into the tagging chute requires considerable skill if the job is to be done quickly and efficiently. The skill of workers depends almost entirely on their knowledge and understanding of cattle. The time analysis for this operation is included in the tagging operation, a discussion of which follows.

Tagging cattle in the tagging chute. Two workers usually are assigned the job of tagging



Figure 26. Driving cattle from specially designed pen at the receiving dock into the tagging chute.

animals in the chute, one puts glue on the tags and hands them to another worker who places the tags (two tags with identical numbers) on each side of the shoulder, back or hip of the animal. The color and sequence of the numbers placed on bulls usually are different from those placed on cattle and calves.

As the tagger places the tags on the animals in the chute, he calls the number and gives a description of the animals to the worker preparing the consignor's sheet. After the animals are tagged, they usually are driven out of the chute by the tagger.

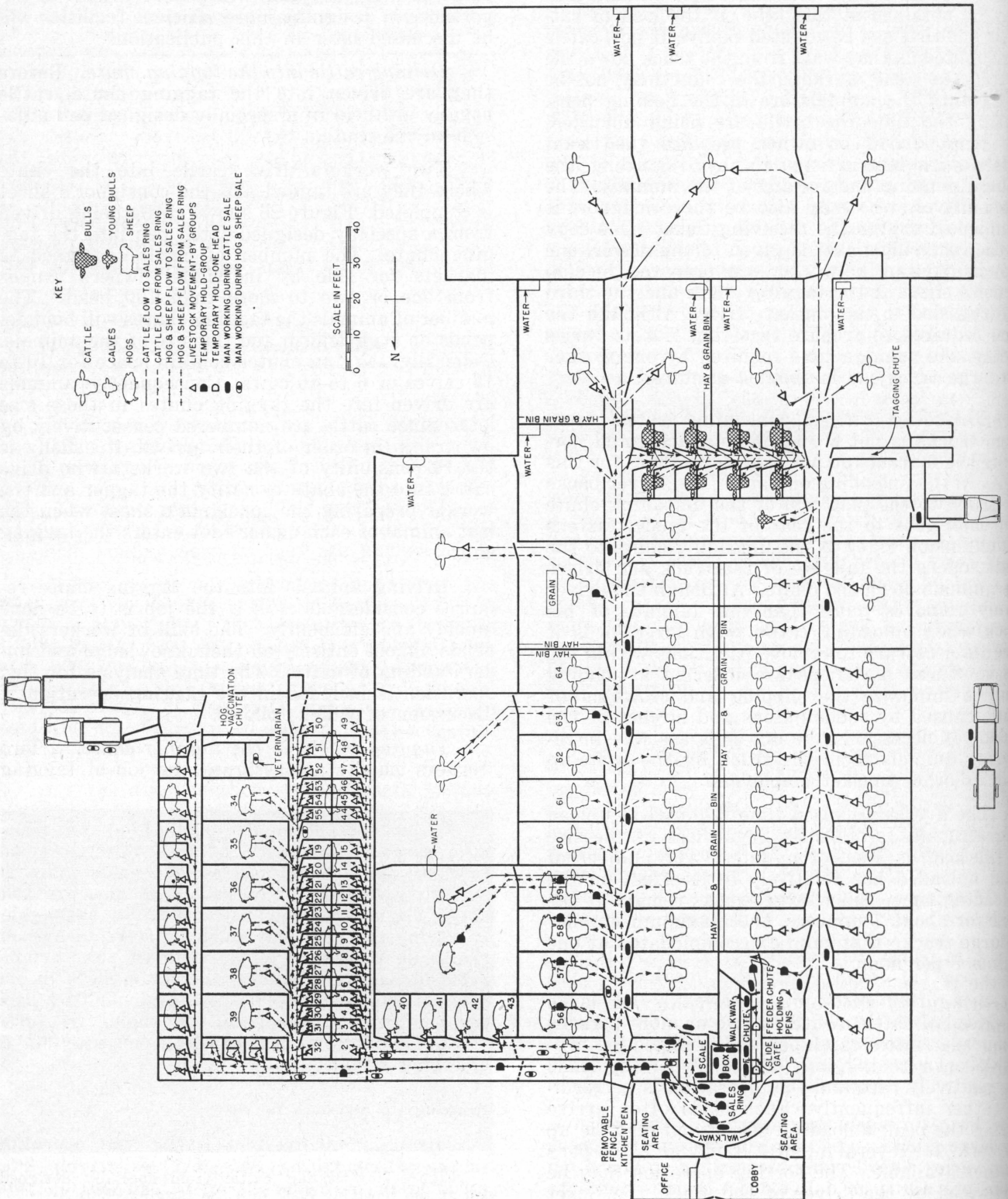


Figure 27. Flow diagram showing the movement of livestock on a typical market during the cycle of selling operations.

The average elapsed time required to drive animals into the chute, tag them and drive them out of the chute is about 0.3 minute per head. Since four workers perform these operations, two driving the animals into the chute and two tagging, the labor requirements for tagging in a chute are about 1.2 man-minutes per head.

Cattle are unloaded from large trucks into a holding pen on some markets and are tagged in the pens. Tagging animals loose in the pen is a hazardous job for the tagger since he has no protection from the animals. Serious injuries have been suffered by taggers performing the operation by this method, and it is not commonly used.

Preparing the consignor's form. All markets use a similar consignor's form. Space is provided for the name and address of the seller, the tag number and description of each animal, the number of the assigned holding pen, the weight of each animal, the selling price, the gross return, the commission rates, the yardage and feeding charges, the total amount of the selling charges and the net amount due the seller. It is the key form in the accounting process and a copy is given the seller along with his check. On many markets, the receiving ticket is used in preparing this form. On markets where most of the volume is received by large trucks, the preparation of this form is started at the time animals are tagged. A separate form is filled out for bulls.

The consignor's form is prepared at the tagging chute by one worker. Part of the form is usually prepared from data on the receiving ticket and part from information given by the tagger. The name and address of the consignor, the tag number and description of each animal and the assigned pen number are recorded at that time. The time required to record this information varies considerably due to the size of consignments and to the fact that it is dependent on the tagging operation and other factors. These factors include waiting for the animals to be driven into the chute, changes in selling instructions and other delays which are beyond the control of the worker preparing the form. Generally, the overall time required to prepare this part of the seller's form is about 5 minutes. A large part of it is included in the tagging time.

Driving animals to holding pens. After animals are tagged in the chute they are released into an alley or holding pen. If the number of animals consigned by a seller exceeds the capacity of the tagging chute, those tagged first are released into the alley or holding pen and are held temporarily until tagging of the entire consignment has been completed. The animals are then yarded in the pen to which they have been assigned by the write-up man.

Two workers usually pen the cattle received by large trucks. The elapsed time of this operation varies considerably, depending on the conditions prevailing on individual markets. Such fac-

tors as the number of block gates, the distance to the holding pen and the efficiency in design and use of alleys reflect on the total penning time. The average time required for two workers to drive cattle to a holding pen about 150 feet from the tagging chute and return to the chute is 2.0 minutes. Thus, the labor requirements for this operation are 4.0 man-minutes.

Selling Livestock

Selling livestock on auction markets involves the performance, in sequence, of the following cycle of operations: (1) bringing up for sale; (2) cutting; (3) driving from cutting pens to the holding pen adjacent to the feeder chute; (4) driving from the holding pen into the chute; (5) working through the feeder chute into the sales ring; (6) selling; (7) weighing; (8) assigning to buyer pens; and (9) yarding in buyer pens. Figure 27 shows the flow of livestock through a typical market while these operations are being performed.

Since these operations are performed in sequence, there is an interdependence among the operations, and a delay in the execution of any one of the nine operations usually results in a delay in all of them. Since the height of activity on auction markets occurs during the selling cycle, delays in performing operations in this cycle result in a maximum unproductive use of labor and the greatest operating cost to the market. It is essential that these operations be performed as efficiently and as smoothly as possible for markets to attain the greatest efficiency.

The rate of all other operations in the cycle must, of necessity, be keyed to the rate at which livestock are sold in the ring. The rate of sale is extremely variable because of psychological, economical and physical factors which enter into the buying and selling of livestock. The rate at which livestock are sold must be acceptable to both buyers and sellers. This rate varies widely among markets and may vary during the sales period on individual markets.

It has been previously pointed out that about 80 percent of the cattle handled through Texas markets are sold as singles. The remaining 20 percent are sold in groups. Hogs also are sold singly and in groups. The sizes of lots vary widely among markets and among different sales on the same market. As a result of the variable rates of sale of livestock and differences in the sizes of lots sold, the methods and facilities used for performing the operations should be sufficiently flexible to permit rapid adjustment to changing situations.

Bringing Up Livestock for Sale

Bringing up livestock is the first operation in the selling cycle. This involves driving livestock from the seller's pens to the cutting pens

or pens formed in the alley near the sales ring. In bringing up animals to be sold, one worker goes to the seller's pen, empties it into the alley, and drives the livestock back to the cutting pen or to the feeder chute holding pen. The time required to bring up a pen lot of cattle, when the distance between the cutting pens and holding pens is about 200 feet, averages 2.3 minutes. Hog pens usually are located near the cutting pens; consequently the bring up distances are much shorter. The average elapsed time required to bring up an average size lot of hogs, when the distances between the cutting pen and hog pens is about 75 feet, is 0.7 minute.

On most markets the bring-up operations for cattle are performed by one worker. Some markets used two workers. The bring-up job for cattle on a few markets is performed by a man on horseback. Time studies indicate no significant difference in the time required for a man riding a horse, and one or two men on foot to perform the bring-up operation. Usually, the man on the horse requires more time to open and close block and pen gates than for men on foot. However, by riding a horse the amount of walking during the course of the sale is considerably reduced. The bring-up operation for hogs is performed by various numbers of men on foot.

The average size lot brought up for sale is about 20 cattle or 4 hogs. Based on the average elapsed time for the distance shown and the average number of animals per lot, the rate at which cattle could be brought up is about 500 head per hour. For hogs, this rate is about 340 head per hour. This is well above the average hourly rate of sale of these animals. Thus, on markets where the distances are not greatly in excess of those shown, one man should have no difficulty in maintaining an adequate number of animals near the ring to insure a continuous sale, particularly where a supply of 50 to 100 cattle is maintained in the cutting pens, alleys and holding pens near the sales ring.

The only difficulty encountered by one bring-up man in maintaining an adequate supply involves bringing up consecutively several small lots of animals which have been penned a considerable distance from the sales ring. This difficulty may be overcome by penning small lots of animals in holding pens near the sales ring.

It is estimated that about 40 percent of the time of this worker when bringing up cattle and about 20 percent when bringing up hogs is wait time. Although he occasionally may perform other jobs, such as watering or feeding stock, his primary responsibility is to have sufficient animals on hand to maintain a continuous sale.

Cutting Livetock

Cutting or sorting livestock is a service rendered on a number of markets for sellers who

want to sell animals in uniform lots rather than as singles. Cutting also includes the separation of cattle by ownership when animals of two or more owners are yarded in the same holding pen. However, as used here the term "cutting livestock" involves the sorting of animals by size, age, breed, color, condition and sex. Crippled or injured livestock also are separated and sold singly. The primary purpose of cutting animals into uniform lots is to present them for sale under the best possible conditions.

The cutting operation involves separating individual animals from a group of livestock by the criteria stated above and placing them in pens. From the alley, two men work the livestock individually into pens to make up uniform lots. A third man opens and closes the gates of the holding pens.

Developing time values for cattle cutting operations is complicated by the wide variations in the size of lots and the temperament of the animals. The size of lots of cattle cut ranged from 2 to 38 head. The average size lot observed was 20 head and the average number cut per operation was 6 head, making 3 cuts per lot. The average elapsed time required to cut cattle is approximately 0.3 minute per head, and the total requirement, with a 3-man crew, is 0.9 man-minute per head.

Based on the average elapsed time per head, the potential hourly rate for cutting cattle with a 3-man crew is approximately 200 head. It is not necessary to cut all consignments. Bulls and milk cows usually are sold singly. Thus, the cutting operation is an irregular one, and it is estimated that not more than 75 percent of the time of the cutting crew is productive time. Regardless of the rate of sale, a 3-man cutting crew rarely has any difficulty in cutting livestock as fast as they can be sold.

The method used for cutting hogs is similar to that used for cattle and usually the same size crew is employed. It is estimated that about 90 percent of the time of the hog cutting crew is spent productively. On some markets, cutting is performed in the ring by the regular ring crew.

Driving Livestock to the Feeder Chute Pen

Two methods are used for driving livestock from the cutting pens to the feeder chute holding pen. Both methods are directly related to the arrangement of the cutting pens.

Regular holding pens, which are used as cutting pens on some markets, often are as far as 150 feet from the feeder chute. To maintain a steady flow of animals into the sales ring, small lots of livestock must be driven from the cutting pens to the holding pen adjacent to the feeder chute at the proper rate. To control this rate, most markets have inserted block gates in the

drive alley which permits the forming of a series of pens extending from the cutting pens to the feeder chute. As many as five or six pens can be formed in one alley.

In driving livestock from the cutting pens to the feeder chute they are advanced from pen to pen until they reach the feeder chute. (See Figures 9, 10 and 11.) Usually one worker is stationed in each holding pen in the drive alley for a total of five or six workers. The duty of each worker is to advance the livestock to the pen ahead as that pen is emptied. Although this method is used primarily for cattle, a few markets follow the same procedure for bringing up hogs to the feeder chute.

Some markets have cutting pens arranged so that the most distant cutting pen is not more than 50 or 60 feet from the feeder chute. This arrangement enables one man to drive cattle from the cutting pens to the feeder chute at the required rate. Although no observations were made of hogs being handled through this latter type of cutting pens, there appears to be no reason why hogs could not be handled satisfactorily through comparable facilities. On most markets, hogs are driven directly from the seller's holding pen to the feeder chute.

Driving Livestock into the Feeder Chute

The next operation in the cycle involves driving livestock from the feeder chute pen into a chute 22 to 25 inches in width or into one 5 to 10 feet in width. These two widths are most common for feeder chutes on the markets studied.

Animals are driven into the narrow-type chute singly. One worker stationed in the feeder chute pen performs this operation, and the length of time required to drive cattle from the pen into the chute depends primarily on the number in the lot. The average size lot driven into the chute is 4 head. The time required to perform the operation is about 0.5 minute. The worker also opens and closes the gates of the feeder chute pen as livestock are driven into it.

Hogs also are driven into the narrow type chute. The usual method is to follow them closely until they reach the entrance door of the sales ring, which requires a 2-man crew.

Cattle are driven singly or in lots from the feeder chute pen into the wide chute. Single animals usually are held adjacent to the sales ring in the feeder chute by a gate designed for this purpose. Although lots of cattle also are held for a short time in the wide chute, they frequently are driven from the feeder chute pen into the sales ring in one operation. Usually one man performs the operation of driving singles into the wide chute. When lots of cattle are driven through the chute, usually two men perform the operation.

Wide chutes usually are constructed with inner gates so that two or three lots of hogs can be held in them at one time. Singles and lots of hogs are driven into the wide chute. Usually the worker driving hogs into the wide chute follows directly behind them until they are driven into the sales ring.

Working Livestock into the Sales Ring

Three types of feeder chutes, which have been described previously, are used on Texas markets to hold a supply of animals adjacent to the sales ring to insure a fast, continuous sale.

The multiple feeder chute holds about 5 cows or 7 calves in each of its narrow side lanes from which cattle are worked singly or in small groups into the sales ring. The center chute holds about 12 cows or 18 calves. Although hogs largely are worked through the center chute of this facility, they are occasionally worked through the side chutes.

The method used in working cattle from the side chutes of the multiple feeder chute into the ring is for one worker, located in the center chute, to have one or more animals ready to enter the ring at all times through one or both side chutes. As soon as the ring is cleared, he drives another animal into the sales ring. Frequently, it is necessary to operate both side chutes to insure availability of cattle. With a feeder chute of this type, one worker can control about 10 cows or 14 calves and is the only worker required for driving cattle from the side chutes into the sales ring. In working hogs through the side chutes, the worker who drives them into the chute follows directly behind them, holds them adjacent to the gate of the sales ring until it opens, then drives them into the ring. Two workers usually are required for working hogs from the side chutes into the sales ring. Cattle are worked from the center chute into the sales ring by a worker stationed in this chute or in one of the side chutes. He is often assisted in driving large groups of cattle into the ring by the worker feeding the chute. Hogs are worked from the center chute into the sales ring in the same manner as from the side chutes.

The long, narrow chutes in use vary widely in length and capacity. Generally, they hold 10 to 20 cows or 15 to 30 calves. Three workers usually are required to drive cattle singly through this chute into the sales ring. One is stationed adjacent to the door of the sales ring and drives the animals into the ring. The other two workers are stationed at intervals and move animals along the chute towards the sales ring. This type of facility is rarely used for hogs.

The open type feeder chute is merely an extension of the bring-up alley to the sales ring with 1 or 2 small pens formed by block gates adjacent to the sales ring. There are many designs and variations in the arrangement of these gates

and in the chute pens for holding livestock adjacent to the sales ring. Generally, a crew of one or two workers is used for working cattle and hogs through these chutes into the sales ring.

The time required to drive single cattle from the narrow or wide chutes is about the same since the next animal to be sold is held adjacent to the sales ring door and when the door opens, it is driven quickly into the ring. The average time required for this operation is about .06 minute and the time between operations is approximately .47 minute. Part of the time between operations is used by the worker to drive the next animal into position to enter the sales ring. When two or more animals are driven from the chute into the ring in one operation, the total time required to perform the operation increases. The increase in time usually is not in proportion to the number of animals driven into the ring.

The average time required to drive single hogs from the narrow chute is about the same as that required for cattle. When single hogs are driven through the wide chute into the sales ring, the average time required is almost twice as long. When groups of hogs are driven through the wide chute into the sales ring, the time increases but it is not in the same proportion as the increase in number of hogs driven into the ring.

Markets equipped with only the long, narrow chute generally do not make a large number of group cattle sales. When they are made, trouble from crowding is encountered frequently in driving cattle through this type of chute, and delays are incurred in driving the animals into the ring.

The elapsed time required to drive single animals into the sales ring is about the same for all three types of feeder chutes. Each type permits single animals to be driven into the sales ring as fast as they can be sold without exhausting the chute capacity of animals held.

In comparing the types of feeder chutes, it should be kept in mind that with the multiple chute one worker performs the operation for cattle and two for hogs. With the narrow, single-feeder chute, usually at least three men are required. The open-type chute is usually operated by one man; however, the arrangement of the chute in some markets is such that two men are required.

Selling Livestock

The selling operation is the one most subject to critical appraisal by buyers, sellers and speculators. Consequently, it should be performed as efficiently as possible. Carelessness in selling causes dissatisfied customers and may result in a loss of business. Conversely, the efficient and businesslike performance of this operation makes a favorable impression on these groups and may increase the volume of business.

Selling begins when the door of the sales ring opens for the livestock to enter the sales ring and ends when the auctioneer announces that the livestock are sold and are driven from the sales ring. Selling livestock involves: (1) driving the livestock into the sales ring, around the ring for display and out of the ring; (2) checking the ownership of the animals; (3) submitting an opening bid; (4) auctioneering; and (5) recording the sales data on the sales ticket. Driving the livestock into the sales ring, submitting an opening bid and auctioneering are elements of the selling operation that usually are performed consecutively. Driving the livestock around and out of the sales ring, checking ownership and recording the sales data usually are performed concurrently with the other elements of the selling operations.

The size of the selling crew varies among markets. Some markets use two ring men, others use three or four. The checking and recording

Table 2. Elapsed time required to sell cattle and hogs in groups of specified sizes on 6 Texas livestock auction markets

Size of group	Average elapsed time required for livestock to enter ring	Average elapsed time livestock remains in ring until starter announces opening bid	Average auctioneering time	Average elapsed time required for removal of livestock from ring after auctioneer says "sold"	Average amount of delay time during sale	Total elapsed selling time	Average elapsed selling time per head
Number	Minutes	Minutes	Minutes	Minutes	Minutes	Minutes	Minutes
Cattle							
1	0.06	0.08	0.34	0.03	0.02	0.53	0.53
2	.06	.11	.47	.03	.06	.73	.36
5	.13	.17	.68	.07	.13	1.18	.24
10	.31	.14	.85	.07	.21	1.58	.16
15	.33	.18	1.07	.11	.15	1.84	.12
Hogs							
1	0.07	0.11	0.25	0.05	0.03	0.53	0.53
2	.18	.13	.28	.07	.04	.70	.35
3	.15	.15	.38	.07	.03	.78	.26
4 ¹	.19	.13	.32	.06	.07	.77	.19
5 ¹	.09	.26	.28	.19	—	.82	.16

¹Based on less than 10 observations.

job is performed by one worker on some markets while other markets employ two persons. Some markets employ one starter for cattle and another for hogs. A typical selling crew consists of seven members—three ring men, an auctioneer, a starter, a checker and a ticket writer. Exceptions may include an additional ring man, an added clerk, a relief auctioneer and a relief starter.

It is the duty of the ring men to open and close the entrance gate to the sales ring, drive the animals around in the ring, open and close the exit gate and drive the animals out. In performing this operation, one worker usually is stationed at each of the gates of the sales ring and one additional worker, who may be the starter, is stationed in the center of the ring. The starter announces the market's opening bid shortly after the livestock enter the ring, or as soon as the preceding sale is completed. The auctioneer immediately begins soliciting additional bids. Meanwhile, the checker checks the numbers on the animals against the numbers on the seller's sheet and the ticket writer records the price and the seller's and buyer's names on the scale ticket.

Table 2 shows the total elapsed selling time for cattle and hogs by groups of specified sizes and by the specified elements of the selling operation which are performed consecutively. The average time required to sell cattle singly is 0.53 minute. Based on this time, the hourly rate sold is 115 head. For short periods, nearly all markets sell single cattle much faster than the hourly rate, and some markets average selling single cattle at the rate of about 150 head per hour.

On some markets, groups of cattle are sold intermittently with singles at an average rate of 150 to 165 head per hour. The hourly rate of sale on markets selling both groups and singles fluctuates widely during each sale and from sale to sale, depending on the number and size of the groups sold.

The average time required for cattle to enter the sales ring, auctioneering time and total selling time increase as the size of the lot sold increases, but not in the same proportion. Although less time per animal is required when livestock are sold in groups or lots, the practice among markets is to sell most cattle singly in accordance with the demands of ranchmen and farmers.

The average delay or wait time during a cattle sale increases as the size of lots increases. Delays are attributable to four major factors: (1) problems arising in identification or record keeping functions; (2) interruptions to permit questions from buyers about the animals being sold or to permit buyers to give instructions on the livestock purchased; (3) interruptions to permit sales talks by sellers; and (4) interruptions to permit the inspection of livestock. The first and last factors are highly important in the sale of large groups.

The average time cattle are in the ring until the starter announces the initial bid is relatively constant among auctions but is highly erratic on individual transactions. This time depends largely on the length of time the livestock are in the ring before the preceding animals are sold. Normally, starters require only a relatively short time to look the livestock over and announce a bid.

The removal of cattle from the ring after the sale also is an erratic operation. The time required usually is governed by the temperament of the animals and by the skill of the ring men. Frequently cattle, particularly Brahmans, become unmanageable in the ring and considerable time is required to remove them.

The average time required to sell hogs singly is 0.53 minute or the same as for cattle. On most markets hogs are sold largely in groups and the average rate is about 225 head per hour. The hourly rate varies widely for different sale days at the same markets because of variations in the size of lots sold. The time required to sell groups of hogs also increases as the size of lots increases, although the increase is comparatively small. The average time required to sell groups of hogs is less than that for the same size groups of cattle. Nearly all of the decrease in the time required for selling hogs in lots is accounted for by reduction in auctioneering time. Usually the number of hog buyers on the market is much smaller than the number of cattle buyers and an equilibrium of prices is more quickly reached. It also should be noted that as the size of the group increases, the selling time per head decreases (Table 2).

Checking the sellers' livestock and recording the names of buyers and prices paid on a scale ticket is an important step in the selling operation. All recordings should be accurate since they are the only ones made of the sales transactions. In the event of disputes among buyers, sellers and the market management, these records must of necessity provide the basis for settlement. On some markets, one worker performs the checking and recording operation; on others, the work of checking sellers' cattle is separated from that of recording the buyers' names and prices paid and a worker is employed for each job. Regardless of whether one or two workers performed the operation, it appears to be performed in a manner satisfactory to both buyer and seller. Generally, about the same time is required to perform the job by two workers as by one. Although one person can do this job as well as two, the second person often is used to share the responsibility. When two persons are used in the operation, each has the opportunity for checking possible errors.

Weighing Livestock

The weighing operation begins when the gate at the drive-on end of the scale platform closes behind the livestock, and ends when the scale

gate at the drive-off end of the platform closes behind the animal as it is driven from the platform. While the animal is on the scale, the weigher makes the weight determinations and recordings. Driving the livestock onto the scale platform is performed by the ringman stationed at the exit gate of the sales ring. Driving animals off the scale platform is performed by gate men located at the drive-off end of the platform. For the purpose of this study, the weigher and the gate men driving animals from the scale platform were considered as comprising the weighing crew. Usually two workers were employed to drive livestock from the platform and one worker made the weight determinations and recordings; thus, the weighing crew consists of three workers.

The average time required to complete the weighing operation for single cattle and hogs is .35 minute. The average wait time between operations is .18 minute. Thus, the average elapsed time of the weighing cycle is .53 minute for both cattle and hogs. With a 3-man crew, total labor requirement per weighing transaction is 1.59 man-minutes. Scale time for lots of animals increases slightly as the size of the lot increases, but not in the same proportion.

Two methods are used for removing animals from the scale platform. By the first method, two gate men are stationed at the drive-off end of the scale platform. After the actual weighing has been completed, one man opens the scale gate and the other goes onto the scale platform and drives the livestock from it. By the second method, one man is stationed at the drive-off end of the platform and the second man is located on the platform. After the actual weighing has been completed, the man outside opens the scale gate and the man on the scale drives the animals out.

The time required to remove cattle from the platform was slightly less for the second method than for the first. The time required for removing hogs was about the same for both methods. A worker stationed on the scale platform usually is more subject to injury from unruly animals than a man located outside it. The practice of weighing livestock with a man on the scale also increases the chance of weighing errors.

Assigning Livestock to Buyers' Pens

Livestock are driven directly from the scale to buyers' pens and it is necessary that the buyer's pen number be assigned as the animal leaves the scale. On most markets, the weigher is responsible for assigning livestock to the proper buyer pen. On a few markets, the auctioneer or a special employee has this duty. Generally, the person performing the job, other than the auctioneer, maintains a chart of buyer pens showing their numbers, underneath which is written the name of the buyer to whom the pen is assigned. The chart also is used in checking the cattle preparatory to loading out after the sale. The time required to assign livestock to buyer pens is rela-

tively small. Since this assignment is usually performed in conjunction with another selling operation, no time studies were made of it. The person assigning livestock to buyer pens calls the assigned pen number to the "pen back" men over a loud speaker as the animals leave the scale. Speaker boxes are located at various intervals in the pen back alleys to facilitate accurate penning.

The assigning of livestock to buyer pens must be performed accurately since mispenning causes unnecessary delays in check-out operations. On most markets, some cattle are penned incorrectly during almost every sale. Whether the man assigning livestock to buyer pens or the "pen back" men are responsible for the errors is difficult to determine since any individual who calls or listens for numbers over a speaker system on half minute intervals for a period of several hours is subject to error. The most effective method observed in locating mispenned animals is to assign the pen back men to the check-out crew.

Yarding Livestock in Buyer Pens

Yarding in buyer pens involves driving the livestock from the scale to the assigned buyer pen. In performing this operation "pen back" men are stationed at intervals in the alley leading to the buyers' pens and each man is responsible for penning the livestock in the pens assigned to him. Each "pen back" man hurries the animal as it passes him on the way to the assigned pen. The man in charge of the assigned pen opens the gate of the pen, drives the animal in and closes the gate behind it. This method is used for penning back livestock on nearly all Texas markets.

The average time required to yard cattle singly to buyers' pens is .33 minute and the wait time between operations is .20 minute. The total time per operation is .53 minute. Little variation in this time was noted because of differences in the width of alleys. Although the time required to pen cattle increases as the distance the cattle are driven increases, the increase in time due to distance is comparatively small. The time required to pen lots of cattle increases as the size of lot increases; however, the increase in time is not in proportion to the increase in the number of head penned. This operation, like all others in the selling cycle, is geared to the actual speed of the sale. It cannot be faster and should not be at a slower rate than the speed with which animals are moved through the sales ring.

On some markets, a man on horseback is used to drive the cattle from the scale to the buyers' pens. The difference in time required for yarding cattle in buyers' pens when this man is mounted is relatively insignificant. Apparently the man on horseback only supplements the work of the "pen back" man.

The number of "pen-back" men employed on the markets studied varied from four to nine, with an average of six. The number of men used

depends primarily on the size and layout of the yards and the number of pens rather than the rate of sale. Markets on which buyers' pens extend straight away from the scale usually employ one man for each six pens. Where buyers' pens are at right angles to the alley leading from the scale, the markets employ one man for each five pens.

Based on the average number of "pen-back" men employed and the average time required to yard cattle, the labor requirement for performing the yarding operation is .53 minute per animal or 3.18 man-minutes for the crew.

Hogs are yarded by the same method as used to yard cattle. The average time required to yard hogs in buyers' pens is .30 minute and the average wait time is .23 minute. Thus, the total time for the operation is .53 minute. On a number of markets, hog pens are dual purpose pens. In most instances they are near the sales ring and the scale and hogs are generally penned nearer the exit gate of the scale than are cattle. Since hog pens are relatively small, one "pen-back" man may yard hogs in 8 to 10 pens. An average of four men was used in penning back hogs on the markets studied. Based on an average crew of four "pen-back" men, the total labor requirement for penning single hogs is 2.12 man-minutes.

Loading Out Livestock

Loading out livestock from the market usually begins shortly after the start of the sale. The first buyers who load out usually are the purchasers of only one or two animals. Load-outs continue intermittently throughout the sale, gradually becoming heavier as the sale nears its end. Heavy load-outs occur after the sale is over and may continue throughout the night, if a relatively large volume has been sold. In some instances, animals may be held on the market a day or two before being loaded out.

The cycle of loading-out operations involves: (1) checking the tag number of the animals against the buyer's sheet; (2) driving the livestock from the buyers' pen to the loading-out dock; and (3) loading onto trucks. The flow diagram of loading-out operations on a typical market is shown in Figure 28.

Checking Buyers' Livestock

Before animals are driven from the pens to be loaded out, load-out men or a checking crew check the buyers' invoice against the tag numbers of the animals bought. Among other items, the invoice includes the name of the buyer, a description of the livestock, the tag numbers on the animals and the number of the pen to which the animals are assigned. After checking the buyer's invoice at the buyer's pen, it may be necessary for the checkers to cut out one or more animals from a group belonging to several buyers. Large buyers usually are assigned an entire pen.

Checking livestock is a time-consuming operation, the actual time required being affected by all mistakes made during the sale. If an animal is not in the proper pen, which is a frequent occurrence, the crew must search other buyer pens for the missing animal. The time required to find a missing animal usually has no relation to the actual time required to check a pen of animals. A pen of 25 cattle can be checked by 3 men in about 10 minutes. If one animal is missing, the time required for the 3 men to locate it may range from 5 minutes to an hour.

During the sale, two men usually are assigned the task of checking livestock for buyers and animals checked during this time are usually loaded out immediately. Usually no more than 20 percent of the total livestock sold is checked and loaded out during the sale. After the sale, about 8 men are assigned the task of checking all livestock against buyers' invoices. These men work in two or three-man crews, and check livestock until an accounting has been made of each head.

Since many sales continue until after dark, a large amount of checking is done at night. It is, therefore, essential that the yard be well lighted. An inadequate lighting system lengthens the time required to check animals and makes the operation more difficult and subject to costly errors.

Driving Livestock to the Loading-out Dock

Livestock are driven from the buyers' pens to the loading-out dock by a crew of 1 to 3 men. Two men usually perform this duty on sales day. This operation is comparatively simple if buyers' pens have free access to the load-out docks. Many markets have facilities that make it necessary for livestock being driven to the loading-out docks to cross the alleys used by the workers bringing up animals for sale and those used for yarding livestock in buyers' pens. When it is necessary to cross these alleys, delays occur and occasionally the livestock become mixed. A cutting operation is then necessary to separate the animals.

Buyers frequently request that their livestock be driven to the loading-out dock before they back their truck against the dock. Meanwhile, another buyer may back his truck against the dock so that the first truck cannot be loaded. Some markets have catch pens at the dock to cope with this problem but most markets do not have such facilities.

Loading Livestock onto Trucks

Loading livestock onto buyers' trucks is the final physical handling operation performed on auction markets and involves backing the truck to the dock, preparing the truck for loading, loading the livestock onto the trucks, preparing the truck for the trip and driving the truck away from the dock. The truck driver usually is as-

form the operation. Small trucks are loaded at the docks previously described for use by small trucks. Straight trucks and tractor trailer trucks are loaded at the large docks. The variation in productive loading time among trucks of different size is caused primarily by the difference in the time required to prepare the truck for loading and to prepare it for the trip.

Unproductive time in loading out livestock is classified as avoidable delay and wait time. Avoidable delay time is the time the truck driver spends waiting at the dock to give the check-out man the invoice for his livestock. Wait time is the period the trucker waits at the dock for his livestock to be driven from the holding pens to the dock and does not include time spent preparing the truck for loading.

The unproductive time consumed in loading cattle onto small trucks is slightly greater than the productive time required. Unproductive time consumed in loading cattle onto straight trucks and tractor-trailer trucks is twice as great as the productive time required.

The wait time in loading hogs onto small trucks is usually less than for cattle and is due primarily to the shorter distance to the load-out dock and fewer check-out problems.

Unproductive time ranges from 2 or 3 minutes to more than an hour when livestock are loaded out on the day of the sale. If loading is done after the checking operation has been completed, the unproductive time is relatively small.

Loading livestock into rail cars is performed by employees under contract with the railroad companies. The market is required only to provide workers to drive the livestock to the holding pens used for loading out by rail and to provide the necessary shipping instructions. Loading livestock into rail cars includes spotting the car, opening the door, placing the bridge between the dock and car, driving livestock into the car, and closing and locking the door. The average time required to load an average size lot of 35 cattle into a rail car is about 6.5 minutes.

Summary of Labor Requirements

The total number of workers employed by livestock auction markets to perform physical handling operations on sales days varies between markets because of differences in the number of operations performed, the design and layout of facilities and the market's labor policy. Markets that do not perform cutting operations usually can operate with 3 fewer workers than those offering this service. Markets that use multiple-type chutes for feeding the sales ring usually require 1 or 2 fewer workers on sales days than markets using the long, narrow-type feeder chute. Because labor is difficult to recruit for a 1-day-a-week operation, most markets guarantee their workers a full day's employment regardless of the length of the sale. Thus, surplus labor may be employed in one operation in the cycle of selling operations while in another operation labor utilization may be at its maximum.

The typical market, for which the labor force is summarized in Table 4, is one on which cutting operations are performed. It has a pen layout somewhat above average for Texas markets, and has the same labor policy of most Texas markets. This market begins receiving livestock at about 7 a.m. and continues until just before the sale ends. The sale begins at 11 a.m. and is completed about 6:30 p.m. Normally, the sale is stopped one hour during the lunch period. Checking animals for loading out is completed about 9 p.m. Livestock are driven from the buyers' pens to the loading-out docks throughout the night as buyers' trucks arrive.

The total number of workers, other than the office crew, employed on this market is 27. For individual markets studied, labor requirements ranged from 22 to 30 workers. This crew consists of the auctioneer, starter, weigher, checker, ticket writer, 3 ring men, the yard foreman and 18 yardmen. The auctioneer, starter, weigher, ticket writer and checker usually perform only one operation each during the course of the sale. Yardmen and ringmen may perform as many as two or three operations since there is no set pattern for the utilization of labor.

Table 3. Productive and unproductive time for loading livestock onto specific type trucks in Texas auctions

Type of truck	Observations	Average head loaded	Average productive loading time per truck	Average unproductive loading time per truck			Total average loading out time per truck
				Avoidable delay	Wait for stock	Total	
	Number	Number	Minutes	Minutes	Minutes	Minutes	Minutes
Cattle							
Small trucks	73	3	3.5	0.6	3.9	4.5	8.0
Straight trucks	38	8	4.6	3.0	5.1	8.1	12.7
Tractor trailer trucks	42	31	8.9	2.0	14.2	16.2	25.1
Hogs							
Small trucks	20	3	3.1	—	2.1	2.1	5.2
Straight trucks	2	30	4.4	1	1	1	1
Tractor trailer trucks	4	40	6.0	1	1	1	1

¹Too few observations.

Table 4 shows the number of workers in each cycle of operations—receiving, selling and loading out—before, during and after the sale. Receiving begins before the sale and is continued, as additional receipts arrive, until just before the close of the sale. Thus, receiving and selling operations are conducted simultaneously. Loading out may begin shortly after the sale starts in which case all three cycles of operations are performed simultaneously. However, activity in receiving and loading out during the sale usually is relatively light and workers are shifted from one job to another in an effort to obtain effective utilization of the labor employed.

Fourteen workers are used for receiving livestock before the sale starts. Their work is directed by the yard foreman. When the sale starts, 12 of these workers are shifted to operations in the selling cycle. The 2 remaining workers perform all receiving and loading-out operations during the sale.

Since the work load in receiving is heavier than in loading out, workers who are guaranteed a full day's employment often are assigned to receiving work since the length of the sale often does not constitute a day's work. As a result, more labor usually is assigned to receiving than is needed.

The height of activity on auction markets occurs during the sale and labor requirements then are at a maximum. The 24 workers required at

Table 4. Number of workers employed on sales days to perform specified operations before, during and after the auction sale on a typical Texas livestock auction market¹

Cycle of operations	Workers employed ²		
	Before sale	During sale	After sale
	Number	Number	Number
Supervisory personnel			
Yard foreman	1	1	1
Receiving livestock:			
Preparing receiving ticket	2	1	—
Tagging	2	—	—
Unloading and penning livestock	10	1	—
Total	14	2 ³	—
Selling livestock:			
Bringing up livestock for sale	—	1	—
Cutting livestock	—	3 ⁴	—
Driving livestock from cutting pens into sales ring	—	4	—
Ringmen	—	3	—
Auctioneering	—	1	—
Starting price	—	1	—
Ticket writer	—	1	—
Checker	—	1	—
Weigher	—	1	—
Scale men	—	2	—
Yarding livestock in buyers' pens	—	6	—
Total	—	24	—
Loading out livestock:			
Checking buyers' livestock and driving livestock to loading docks	—	2 ³	8
Driving livestock to loading docks	—	—	2
Total	—	2	8 ⁵
Total number of workers employed	—	27	—

¹The labor force shown is primarily for cattle operations.

²Excludes office personnel.

³These workers perform all receiving and loading out operations during the sale.

⁴When the cutting operation is not performed, the market may operate with a total of 24 workers.

⁵Two workers who drive livestock to the loading docks are included in the total of 8 workers performing the "checking of buyers' pens and driving livestock to the loading docks."

that time are obtained by having 12 workers shift from receiving and by having 12 additional workers report for duty.

As previously pointed out, operations in the selling cycle are performed in sequence and all are keyed to the rate at which livestock are sold. Although there is a considerable variation in the average rate of sale among markets, it is not so great as to have any significant effect on the labor requirements.

At the end of the sale, 8 of the yardmen are shifted to loading-out operations. These workers usually replace the 2 workers who have been performing these operations during the sale. The principal duties of these workers are to check animals in buyers' pens against the buyers' invoice and to drive the animals from the pen to the loading-out docks. The checking job is first completed, then 6 workers are relieved and 2 remain on duty to drive the livestock from buyers' pens to loading-out docks as buyers' trucks arrive throughout the night.

LIVESTOCK AUCTION MARKET SUGGESTED FOR TEXAS

In developing principles and criteria for use in planning improved livestock auction market facilities in Texas, the primary objectives are: (1) to provide adequate protection to the animals handled and the workers employed so that losses from injuries and other causes will be minimized; (2) to reduce the amounts of labor required for handling livestock and otherwise increase operational efficiency; (3) to maintain the desired rate of sales consistent with the accurate and efficient performance of the operations involved; and (4) to provide for the effective operation of the price-making forces of supply and demand. The attainment of these objectives should, of course, correct the defects noted in existing markets.

The plans for a livestock auction market presented in this section are intended to illustrate only the principles of layout, design and size in relation to volume and species handled, which are applicable to this type of facility. These plans are not suggested for any specific market or locality.

For the purpose of illustrating these principles a market of model size for Texas has been selected. This market would handle, with normal operations, about 700 cattle and 200 hogs per sale. Sheep, goats, horses and mules, in relatively small volume, would be handled in cattle pens. All livestock would be received and shipped by trucks and trailers.

The major types of facilities needed are: (1) the yards for receiving, holding and shipping livestock, and (2) the auction or sales barn, which should include space for the market office and toilet facilities.

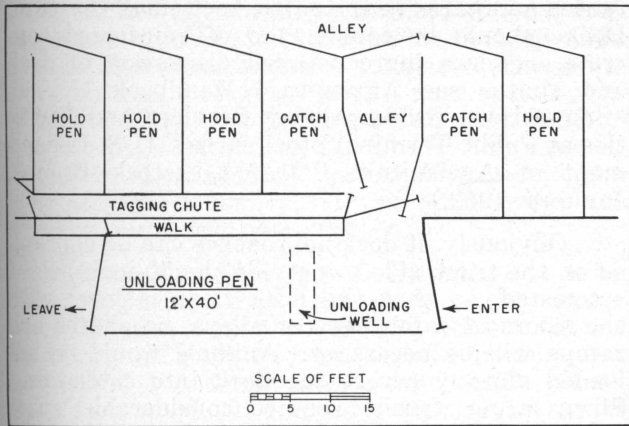


Figure 29. Suggested layout of a pen for unloading animals from pickup trucks and automobile trailers.

This market also should have paved or surfaced driveways and a parking area for automobiles and trucks.

Yard Facilities

Pens, Docks and Chutes for Unloading Trucks

Livestock are received on Texas auction markets from trucks and trailers which have considerable variation in the height of their floors or beds and in their load capacities. Therefore, unloading pens, docks and chutes are needed for unloading animals efficiently. Unloading pens are used for pickup trucks and car trailers; docks and chutes are used for larger trucks and semitrailers.

Unloading pen. The unloading pen should be outside of but immediately adjacent to the side of the yards where the sellers' holding pens will be located. Since animals are tagged before being unloaded from small trucks and car trailers, it is necessary for the unloading pen to open into the tagging chute. This pen should be 40 feet long and 12 feet wide, with 12-foot gates at each end. The unloading pen should connect with a catch pen or alley in the yards through a 10-foot gate (Figure 29).

The truck lane through the pen should be surfaced with gravel and should be constructed with a depression or unloading well in which the rear wheels of the truck are stopped to lower the truckbed sufficiently to permit animals to step off the truck onto the ground. The unloading well should be paved and adequate drainage provided. A small unloading wooden chute might be used for unloading livestock from the truck to the floor of the pen instead of an unloading well.

Fences enclosing the unloading pen should be 5 feet in height, except in areas where considerable Brahman and other nervous cattle are grown. Posts should be of 6 by 6-inch material spaced not more than 7 feet apart. For the 5-foot fence, fence rails should consist of 5 pieces

of 2 by 6-inch or 4 pieces of 2 by 8-inch unfinished boards. Hip boards are unnecessary in the unloading pen. Gates should be constructed of similar materials and swung with the lower rail 6 inches above ground.

Docks and chutes. For use in unloading larger trucks and semitrailers, docks, chutes and chute pens are suggested. With this type of facility, the difference in the height of the bed or floor of the vehicle and the floor level of chute pens can be bridged more easily than by the use of unloading pens. Unloading docks and chutes should be on the side of the yards where sellers' holding pens will be located and the chute pens should connect with catch pens or alleys.

Unloading docks should be 3 feet deep and 50 inches high and, if above the elevation of the yard should be connected to it with chutes leading from dock platform to the floor of the chute pens (Figure 30). Twenty-two feet of dock space should be provided and the minimum distance from center to center of chutes should be 12 feet. This amount of dock space would permit two trucks to unload simultaneously without crowding.

Chutes connecting the dock and the chute pens should be stepped, with 4 inch risers and 15 inch treads. If the inside of the dock is 50 inches

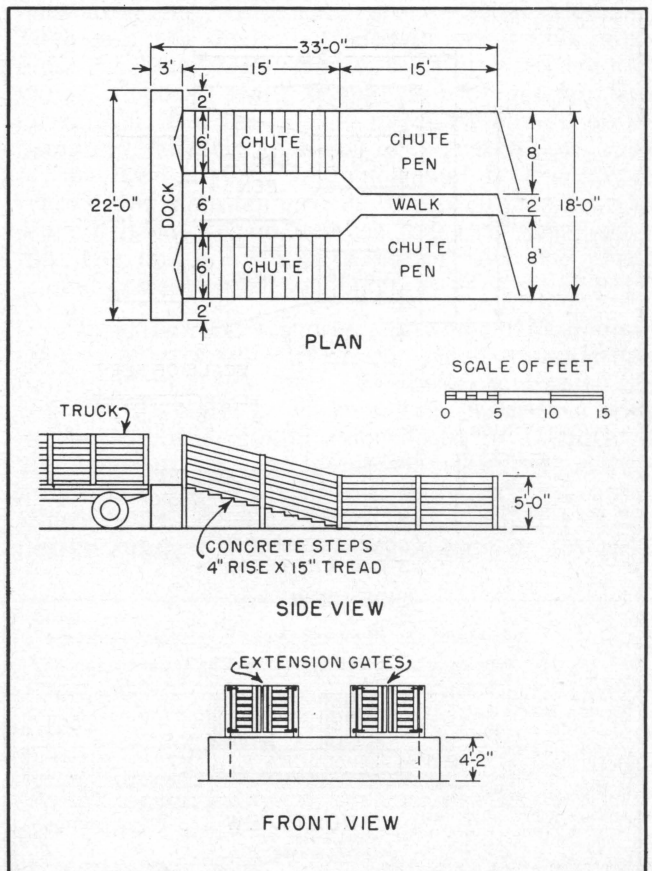


Figure 30. Suggested design of dock and chute for unloading animals from straight trucks and semitrailers.

high, a chute 15 feet long with 12 treads would be required to connect the dock with the floor of the chute pen. Where the dock approach on the truck side can be depressed 2 feet, the inside height of the dock will be 26 inches above ground level and the length of the chute needed to connect the dock and chute pen will be about 8 feet. Another type of chute that might be used contains a cleated floor ramp rather than steps. The use of the latter type chute is now prevalent in Texas markets. (Research conducted by the Livestock Branch, Production and Marketing Administration, USDA, shows that livestock will move up and down a stepped chute with less hesitation and greater speed than they will move over the cleated floor ramp type.)

Each of the two chutes should be 6 feet wide and constructed parallel to each other with the inner sides 6 feet apart. This 6 by 15-foot area between the chutes can be used for a small shelter house if needed. A two-foot walk should extend from this area or from the dock to the end of the chute pens. These pens should be 8 feet wide and 15 feet deep and should be separated by the walk. Three-foot double gates with 18-inch extensions should be provided at the dock-ends of the chutes and a single 6-foot gate at the chute pen end. Construction details of chute sides and gates should be similar to those recommended for

fences and gates in the cattle section of the yard. Docks should be constructed of reinforced concrete. (For a more detailed discussion of dock and chutes see Agriculture Handbook No. 36, "Suggestions for Improving Services and Facilities at Public Terminal Stockyards," U. S. Department of Agriculture, PMA, Livestock Branch, January 1952.)

Obviously, if dock approaches can be depressed on the truck side to provide the 50-inch height suggested, so that the dock floor is level with the floors of catch pens or alleys, no chutes and ramps will be necessary. Animals would be unloaded directly across the dock into catch pens. Since larger trucks require considerable space for entering and leaving the dock area, and for maneuvering within the area, the dock approaches should be about 150 feet deep and 100 feet wide. This area should be well drained and should be surfaced with gravel or other material to stand up under the weight of heavy trucks. With 1 pen for pick-up trucks and car trailers and 2 dock spaces and chutes for larger trucks, 3 motor vehicles could be loaded at the same time.

Docks and Chutes for Loading Trucks

Docks and chutes of different designs are needed for loading pickup trucks and car trailers than those needed for loading larger trucks and semitrailers. Although a pen was recommended for unloading small trucks and trailers, this type of facility is not recommended for loading such vehicles. Because of differences in the heights of the floors or beds of small trucks and trailers and those of the larger vehicles, docks and chutes designed for the latter type of vehicle cannot be used efficiently for loading small trucks and trailers.

Since receiving and loading out operations are performed concurrently during a part of the sales, and to avoid or minimize back and out-of-line "hauls" in moving livestock through the yards, it is not recommended that docks and chutes provided for receiving livestock be used for loading out animals. With the possible exception of a dock and chute for loading out hogs, all docks and chutes for loading trucks should be on the side of the yard where buyers' holding pens are located.

Docks and chutes for loading large trucks and semitrailers should be of the design previously described for use in unloading these vehicles. Twenty-two feet of dock space, which will be ample for loading out two large trucks simultaneously, should be provided on the improved facility.

Docks for loading pickup trucks and car trailers should be 3 feet deep and 2 feet high and, if above the elevation of the yard, should be connected to it with chutes leading from the floor of the dock to the floor of the chute pen (Figure 31). Eighteen feet of dock space should be

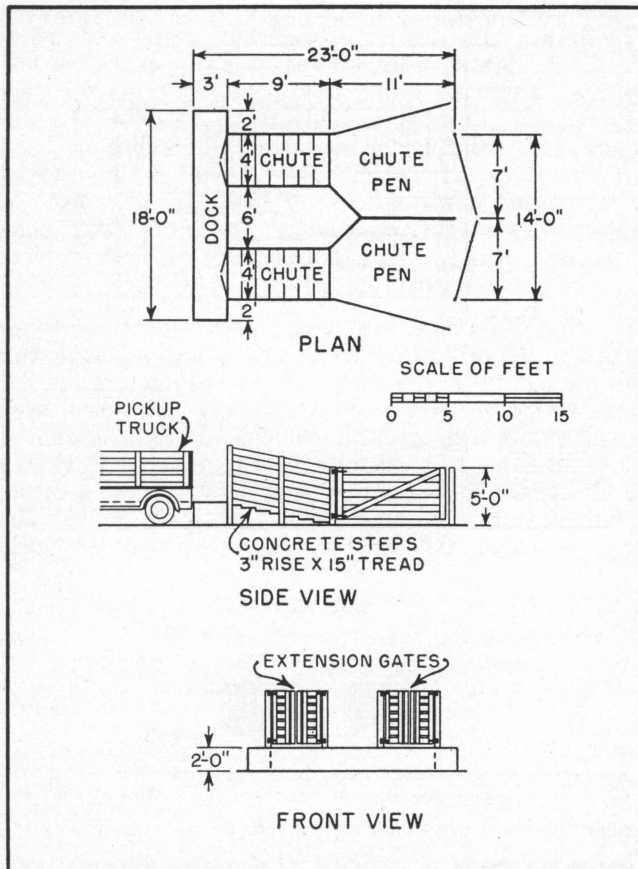


Figure 31. Suggested design of dock and chute for loading animals onto pickup trucks and automobile trailers.

provided and the minimum distance from center to center of chutes should be 10 feet to allow two small vehicles to load at the same time without crowding. A third single unit dock 6 feet wide should be provided for loading out hogs, if the hog pens are not on the side of the yard adjacent to other loading docks. This would provide dock space for loading two large trucks and three small trucks simultaneously.

Chutes connecting the docks with the chute pens should be 4 feet wide, and should be constructed with 3-inch risers and 15-inch treads, or a total of 9 feet, to provide the proper pitch or incline. The inner sides of the chutes should be 6 feet apart. This 6 by 9-foot space can be used for a shelter house, as suggested for the larger chutes. Each of the chutes should lead into 7 by 11-foot chute pens. Double extension gates should be provided at the dock end of the chutes and full width single gates at the chute pen end. No walkway is provided between the chute pens.

Approaches or driveways to loading docks should be comparable with those suggested for unloading docks.

Catch Pens

With the possible exception of special facilities for loading out hogs, catch pens should be provided immediately back of and connecting directly with all chute pens and docks used for unloading and loading out livestock. The various operations in these cycles usually are performed in sequence and delays in one operation in the cycle will tend to result in equal delays in the operations that follow. In the cycle of receiving operations, catch pens break the sequence of unloading and tagging operations and permit their performance at different rates.

On the opposite side from unloading pens, docks and chutes, catch pens should connect either with alleys leading directly to holding pens, the tagging chute or other catch pens. All catch pens should contain sufficient gates so placed that livestock can be moved into and through the pens in the shortest possible distance with a minimum of out-of-line and back drives.

Fences enclosing catch pens and pen gates should be of similar construction to those used for cattle holding pens which are discussed in the following section.

On the suggested facility, a minimum of four catch pens (an average of two pens per truck dock space) containing a total of roughly 1,000 square feet of space, should be provided adjacent to the docks and chutes for unloading straight trucks and semitrailers. Two catch pens containing a total of about 400 square feet of space, should be provided adjacent to the pen for unloading pickup trucks and automobile trailers. These two pens can be used for penning the last

of the sellers' cattle arriving on the market. Following the completion of receiving operations, catch pens adjacent to the docks for large trucks also can be used as sellers' holding pens. Allowing 14 square feet of pen space per head of cattle, these catch pens could be used for temporarily holding 70 head. However, the use of catch pens near the docks as sellers' holding pens would be infrequent and their use for this purpose should not be considered in determining the amount of space in and the number of sellers' holding pens needed for efficiently handling a volume of about 700 head per sale.

Loading Pens

With the exception of the dock and chute suggested for loading out full truckloads of hogs, one loading pen per truck dock space should be provided adjacent to the loading docks and chutes, or a total of four pens. These pens contain a total of about 3,000 square feet of space. The use of loading pens in loading-out operations is comparable with that of catch pens in receiving operations.

Cattle Tagging Chute

Because of possible injuries to workers and the relatively high labor requirements, cattle received on straight trucks and semitrailers should not be tagged while they are on these vehicles. To attain the desired production rate and minimize the labor required for tagging cattle in the yards, a special chute should be provided for this operation. The cattle tagging chute should be located immediately adjacent to the catch pens back of the dock and chute for unloading the larger trucks and semitrailers so that animals can be moved directly from one or more of these pens into the chute. At its opposite end, the chute should connect with an alley.

In effect the tagging chute is nothing more than a narrow alley through which animals can be moved in single file. As shown in Figure 32, this chute should be 40 feet long, 33 inches wide at the top, and should slope down to a width of 20 inches at the ground level to prevent calves and other small animals from turning around. Chute fences should be five feet high and of the design suggested for the unloading pen. A foot-

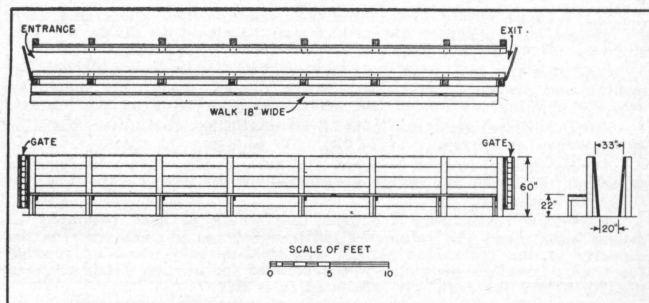


Figure 32. Suggested design for a cattle tagging chute.

walk or platform 22 inches high and 18 inches wide should parallel one side of the chute for its entire length, thus permitting the taggers to lean over the chute fence and make easy contact with the animals for hip tagging or ear tagging.

The entrance end of the chute and the end leading into the alley should be equipped with a hinged gate.

Hogs are not tagged in tagging chutes and no tagging facilities are needed for this species.

Holding Pens

The number, sizes and types of holding pens needed on livestock auction markets is directly related to or is dependent on such factors as: (1) volume of receipts per sale; (2) species handled; (3) average sizes, by species, of animals handled; (4) total number of sellers and the number who request separate pens for each lot of animals consigned; (5) number of buyers and the ranges in volumes purchased; (6) arrival of receipts in re-

Table 5. Types and numbers of holding pens and total pen area for suggested livestock auction market for Texas

Type of pens	Number of pens		Pen area
	Number	Square feet	
Sellers' cattle pens:			
10 by 17 feet	4	680	
10 by 20 feet	7	1,400	
10 by 40 feet ¹	16	6,400	
Subtotal	27 ²	8,480	
Buyers' cattle pens:			
10 by 20 feet	21	4,200	
10 by 30 feet	21	6,300	
Subtotal	42	10,500	
Dual-purpose cattle pens:³			
10 by 30 feet ⁴	14	5,200	
Overflow cattle pens:⁵			
20 by 52 feet	1	1,040	
40 by 40 feet	1	1,600	
40 by 30 feet	1	1,200	
40 by 50 feet	1	2,000	
Subtotal	4	5,840	
Dual-purpose bull pens:			
4 by 8 feet	14	448	
Total cattle pen space		30,468	
Dual-purpose hog pens:			
8 by 16 feet ⁶	12	1,536	
8 by 8 feet	12	768	
Total hog pen space	24	2,304	
Total holding pen space		32,772	

¹These pens should have gates that open on two alleys and each pen should have a center gate which can be closed to divide the pen into two 10- by 20-foot pens.

²Includes the two catch pens suggested in connection with the unloading pen previously described. When needed, these pens should be used for penning the last of the sellers' cattle arriving on the market.

³Dual-purpose pens are pens that might be used alternately by either sellers or buyers.

⁴These pens should be designed and arranged as shown in footnote 1, except that each pen would be divided by the center gate into two 10 by 15-foot pens.

⁵Overflow cattle pens are pens that would be used primarily as sellers' pens when the volume of cattle consigned per sale exceeds the capacity of the designated sellers' and dual-purpose pens, or roughly 700 head. Overflow pens also would be used for holding cattle received the day before the regularly scheduled sales day.

⁶Six of these pens should be designed and arranged as shown in footnote 1, except that each pen would be divided by the center gate into two 8 by 8-foot pens.

lation to hours of sale; (7) rate of sale; and (8) loading out animals sold in relation to hours of sale.

As previously pointed out, a market of modal size for Texas would handle, during most of the year, about 700 cattle and about 200 hogs per sale. Because of seasonal variations in the marketing of livestock, the volumes consigned for several sales each year may be twice as large as normal consignments. Allowance must be made for the heavy sales periods in determining the total amount of space needed in holding pens. Although the suggested market might handle a few sheep, horses, and mules, in most Texas localities, outside of the Edwards Plateau area, where sheep production is relatively large, it would not handle sufficient volumes of these species to justify specially designed holding pens for them. Cattle pens would be used for holding these species. Specially designed pens would be needed for bulls which usually are held in individual pens.

The operations on livestock auction markets, including the flow of livestock through the facility, is such that cattle holding pens should be provided for both buyers and sellers. Only one set of holding pens for hogs is suggested for buyers and sellers.

As a result of buyer and seller practices previously mentioned, and the large-size cattle pens prevalent on most Texas auction markets, it is rarely possible to utilize more than 50 percent of the space in the sellers' pens and 60 percent in the buyers' pens. Even on the most efficient markets, space in hog pens, including those assigned to both buyers and sellers, is rarely utilized at more than 70 percent of total capacity.

By providing cattle holding pens of smaller sizes than those now used on Texas markets, or by designing the pens so that one relatively large pen with gates opening on two alleys can be converted into two pens by the use of a center gate, it is estimated that the utilization of pen space in both sellers' and buyers' pens on the suggested market could be increased to 70 percent of total capacity. It is not contemplated that any increase in the present 70 percent utilization of hog pen space could be obtained.

In determining the amount of space per animal that should be provided in holding pens, at least three factors should be considered: (1) the weight of the animal, (2) the length of time the animal will be held in the pen, and (3) the climate of the area in which the market is located.

The average weight of cattle handled on Texas auction markets is about 550 pounds. The length of time cattle are held in pens is extremely variable. On the suggested market, it is estimated that cattle would be held in the sellers' pens 1 to 6 hours and in buyers' pens 1 to 8 hours. Hogs would be held in pens 3 to 9 hours. Based

on these factors, it is suggested that 14 square feet of space per head be provided in both sellers' and buyers' cattle holding pens. Assuming that hogs of uniform size will be yarded in the same pens, it is suggested that 6 square feet of space per head be provided in holding pens for both sellers' and buyers' pens.

Table 5 shows the types of pens, the number of pens of each type and the total space needed in holding pens of all types on a livestock auction market that will handle roughly 700 cattle and 200 hogs per sale, but which on peak-volume sales days could accommodate about 1,000 cattle and 270 hogs. In determining the types of pens needed for most efficient operations, consideration has been given to the possibilities of utilizing a limited number of cattle pens and all bull and hog pens as both sellers' and buyers' pens. These pens are referred to as "dual-purpose" pens. To be used by both sellers and buyers on the same sales days, holding pens necessarily must be emptied of sellers' livestock before the pens can be assigned to buyers. There are limitations as to the number of cattle pens that can be utilized efficiently by both sellers and buyers on the same day on a market handling about 700 cattle per sale. By using the 14 dual-purpose cattle pens first as sellers' pens and as they are emptied as buyers' pens, sellers' cattle can be penned in 41 pens. The 14 dual-purpose pens and 16 of the sellers' pens can be divided into 60 pens by the use of the middle gate. These with the 11 sellers' pens that cannot be divided, brings the total number of pens than can be assigned to sellers to 71. Sellers' cattle also can be penned in the four overflow pens.

The flexibility in the design of sellers' and dual-purpose cattle pens should enable the market to accommodate practically all the demand for individual pens. By using the 14 dual-purpose cattle pens as buyers' pens, buyers' cattle can be penned in 56 pens. Since the 14 dual-purpose pens can be divided into 28 pens, a total of 70 pens can be assigned to buyers.

A total of 13,680 square feet of pen space is provided in the 41 sellers' cattle pens and the 14 dual-purpose pens. Allowing 14 square feet per head and with 70 percent utilization of space, about 684 cattle can be accommodated. The 14 dual-purpose bull pens will accommodate 14 bulls. Thus, the sellers' and dual-purpose cattle pens would accommodate about 700 head.

The four overflow cattle pens would be used principally for penning sellers' cattle arriving on the market a day or two before the sale and for peak volume sales. These pens provide a total of 5,840 square feet of space and would accommodate 292 cattle. Thus, the total capacity of the market would be roughly 1,000 cattle. However, the market could not be operated as efficiently when 1,000 cattle are handled per sale as when the number per sale does not exceed 700.

A total of 15,700 square feet of space would be provided in the 42 buyers' cattle pens and the 14 dual-purpose cattle pens. Allowing 14 square feet of space and with 70 percent utilization of space, 785 cattle could be held in these pens. Thus, sufficient holding pen space should be available to buyers even to the extent of providing some of the very small buyers with separate pens. On peak volume sales days, cattle could be penned back in the sellers' pens. This practice would rarely be necessary since usually about 20 percent of the buyers' cattle are loaded out during the sale.

Six of the 24 dual-purpose hog pens can be divided by a middle gate to make a total of 30 pens. These pens would provide 2,304 square feet of space and, allowing 6 square feet per head, with 70 percent utilization, would accommodate 268 hogs. With normal operations, 3 or 4 pens would be kept open for penning buyers' hogs at the start of the sale. Thus, the capacity of the market for hogs would be about 200 head.

It is not suggested that the floors of the cattle pens be paved. Adequate provisions should be made for draining the pens and shallow, open drainage ditches along the fence lines are suggested for this purpose if the topography of the market area is suitable. Where natural drainage cannot be obtained, an underground drainage system should be provided. If the market is located in an area where the rainfall is comparatively heavy, a roof should be constructed over the cattle pens and alleys. If located in an area of relatively limited rainfall, no roof over this section of the yards is suggested.

Generally, the fences of the cattle pens should be 5 feet high. Line posts should be either 6-inch top round or 5 by 5-inch top squared material spaced not more than 7 feet apart. Corner and gate posts should be either 8-inch top round or 8 by 8-inch top squared. All pine posts should be pressure treated with either cold tar creosote or a petroleum solution of pentachlorophenol. Fence rails should consist of either 5 pieces of 2 by 6-inch or 4 pieces of 2 by 8-inch lumber. The lower rail should be 6 inches above ground level. More heavily constructed fences are necessary in areas with relatively large numbers of Brahman and Brahman-cross cattle. Bull pen fences also should be of heavier construction. In the section of the State where Brahman cattle are not too prevalent, consideration might be given to the use of 1 by 6-inch boards for fence rails. Pen gates should open on alleys and should be of sufficient length to close the alley without the use of A-frames. This length permits the pen gates to be used as block gates. Gates usually are constructed of the same material as used for fences. However, gates are subjected to hard usage and should be constructed with tension and compression braces.

Hog holding pens and alleys should be covered and the eaves of the roof should be about 8

feet above ground level. The floors of the pens should be concreted and should have adequate drainage for flushing and cleaning. An open drain having a top width of 16 inches and a semi-circular bottom 8 inches in diameter, is suggested. The depth of the drain should vary from 6 inches to whatever is necessary to give it a good fall. Wooden cover boards should be provided where the alley crosses the drain. Fences enclosing the pens should be 3-1/2 feet high. Line posts should be 4-inch top round or 4 by 4-inch top square material set not more than 5 feet apart. Corner and gate posts should be of 6-inch top round or 6 by 6-inch top square material. All pine posts should be treated with either creosote or pentachlorophenol. Fences should be faced on each side with 2 pieces of 1 by 10-inch and 2 pieces of 1 by 6-inch lumber, or with steel landing strip material. This material is manufactured in strips about 6-feet long and 3-1/2 feet wide and is made up of interlaced strands of 3/4-inch strip steel crossed at 4-inch intervals. The principles applicable to cattle pen gates also apply to hog pen gates.

Alleys

Alleys should be of sufficient width to expedite the movement of livestock on the market

and, in the cattle section, to permit the use of a truck for cleaning the pens, hauling feed to the pens and other comparable uses. With the exception of those sections of the market where hog and bull pens will be located, alleys should be 10 feet wide. In localities where fire lanes are required, the width of alleys used for such lanes must, of course, conform with local ordinances. It is suggested that all alleys in the cattle section be paved with black top paving of 1 to 1-1/2-inch thickness. The black top paving mix used in paving alleys should be the same specifications as that recommended by the State Highway Department for the locality in which the market is situated. The black top should be laid on a 6 to 8-inch compact base. Alleys in the hog section should be 6 feet wide and should be paved with concrete. Individual bull pens should be so arranged that they will open on a 4-foot alley, which is to be used only for driving these animals to and from the pens.

Facilities for Driving Animals Into the Sales Ring

To minimize the amount of labor required for bringing up animals from the holding pens and driving them into the sales ring and, at the same time, maintain the desired rate of sale, a system of block gates, a group of cutting pens and a feeder chute are suggested.

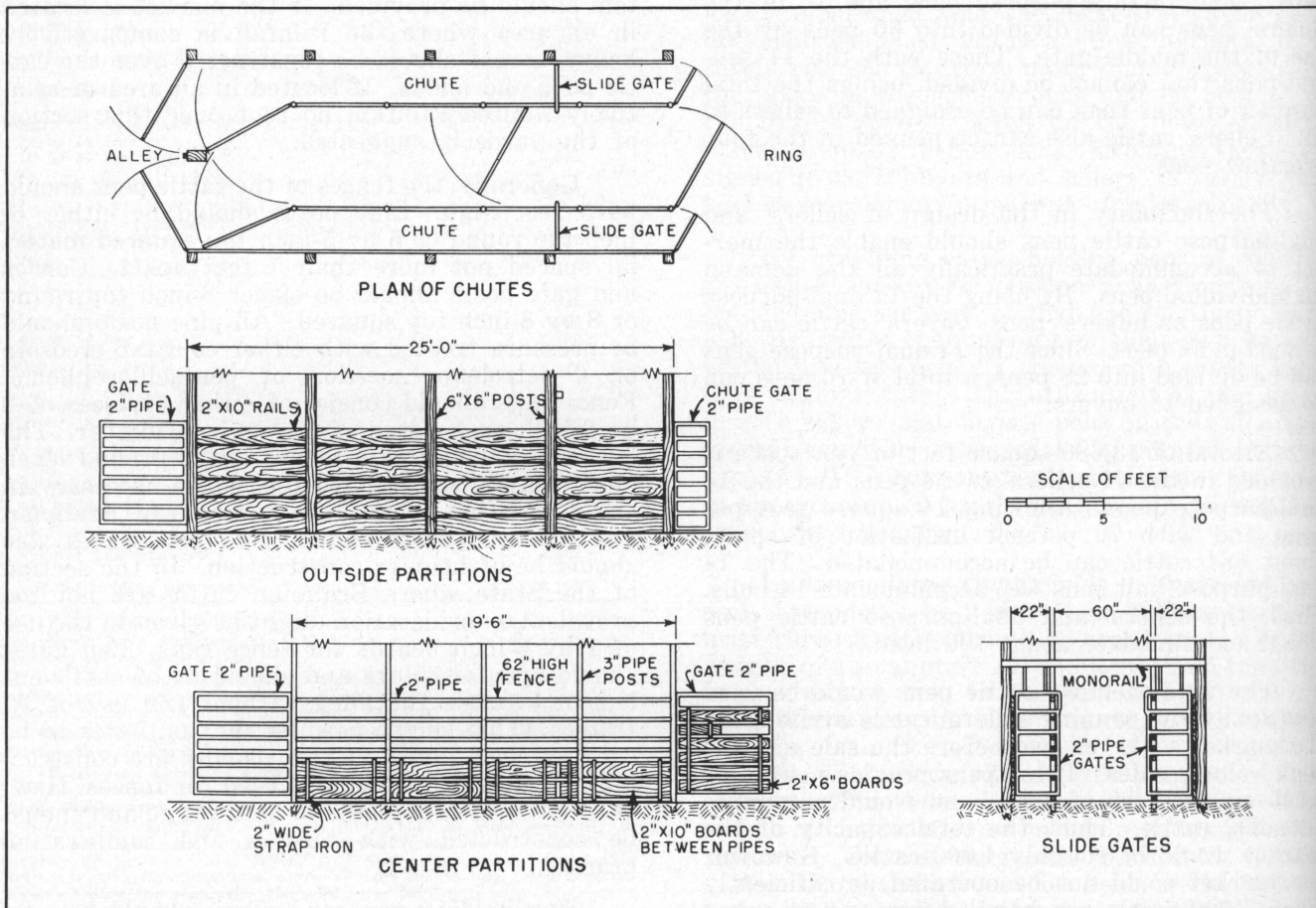


Figure 33. Suggested design for a multiple-type chute for driving animals into the sales ring.

Block gates. To permit the use of alleys for temporarily holding lots of animals while they are being brought up from the holding pens to the cutting alleys and pens adjacent to the sales ring, block gates should be provided at the intersections of all alleys and at strategic points between these intersections in the longer alleys. Through the use of such gates, a series of "block pens" can be created in the alleys extending from the more distant holding pens to the cutting alleys and pens. Block gates also expedite the moving of animals in other operations, since they make possible the driving of animals in any direction.

Block gates should be of the same width as the alleys (10 feet except in the hog and bull sections) and of the same height as the adjacent fences. Block gates should be of similar construction to holding pen gates.

Cutting alleys and pens. Cutting or sorting livestock on auction markets may involve separating one lot of animals into many lots on the basis of ownership, sex, size, age, color and condition. For that reason, a series of 5 cutting pens, all leading off one alley and leading into the alley connecting directly with the feeder chute holding pen, should be provided. These alleys should intersect other alleys at the four corners of the cutting pen section so that these pens will be entirely surrounded by alleys.

Cutting pens should be 10 feet wide and 20 feet deep and should have 10-foot gates at each end. The surrounding alleys should be 10 feet wide. The 50-foot alley at the end of the pens opposite the feeder chute and sales ring is the cutting alley. Animals driven into this alley are sorted by driving individual animals into the proper cutting pen where they are held until moved up, lot by lot, into the feeder chute holding pen. Fences and gates in this section of the market should be of similar construction to that suggested for cattle holding pens.

Feeder chute. The market yards and the sales ring should be connected by a multiple-type, 3-lane, feeder chute through which animals are driven directly into the ring. The feeder chute is 25 feet long and 9 feet wide. It is divided into 3 lanes, a 5-foot center lane which is paralleled on each side by 22-inch (inside dimension) outer lanes.

As shown in Figure 33, double gates, each roughly 4½ feet wide, are used at the entrance end of the chute leading from the feeder chute holding pen. These gates are hinged at the side to the outer chute partitions and close against a post stop in the center of the chute. Double gates of approximately the same width are set back about 4 feet from the entrance and are swung from the inner partitions to close against the inner side of the same post stop when shut and against the outer partitions when open. By opening one outer gate and closing the inner gates, animals are diverted into an outer lane. By opening both sets of gates (which closes the entrances

to the outer lanes), animals are diverted into the center lane. At the exit ends of the chutes, single hinged gates are used for each lane. Slide, block gates are placed in each of the outer lanes 6 feet back of the exit gates. These gates operate on an overhead monorail. Temporary gates may also be placed in a comparable position in the center lane for use with hog and sheep sales.

The outside partitions or walls of the chute should be constructed of 6 by 6-inch posts spaced 6 feet apart on center and solid faced on the inside from the ground level up with 6 pieces of 2 by 10-inch lumber. The inner partitions are constructed of 3-inch iron pipe posts spaced 5 feet apart, to which are welded at intervals (see elevation of center portions in Figure 33) 2-inch pipe to form the rails. Two pieces of 2 by 10-inch lumber are strapped inside of and flush with the surfaces of the lower rails. Gate construction details also are shown in Figure 33.

The outer lanes of the chute are used when singles are being sold. Each lane will hold 5 to 7 animals. The outer lanes usually are filled alternately by one worker. The center lane is used when groups of animals, bulls and large single animals are being sold.

The feeder chute holding pen formed with block gates in an alley adjacent to the chute entrance should be 10 by 15 feet.

Catwalks

"Catwalks" constructed over the yards provide market patrons, brand inspectors and others a means for inspecting livestock without the necessity for walking through the alleys and climbing over fences. Such walks also are desired by supervisory employees of the market in directing yard operations and by other employees in locating strays.

Catwalks should be constructed 11 feet above the ground level of the yards and preferably over an appropriate number of alleys so that an unobstructed view may be had of pens along the alley. Catwalks should be supported on 6 by 6-

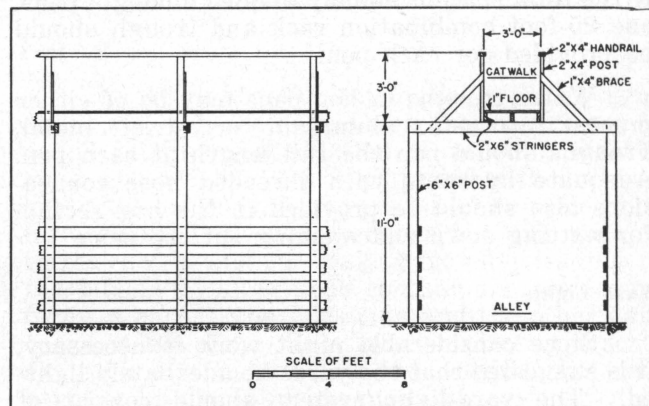


Figure 34. Suggested detail of catwalks over market yards.

inch posts, spaced not more than 7 feet apart, across the top of which 2 by 6-inch stringers are placed (Figure 34). Supporting posts are used as the posts for the fences underneath. For a Texas market of modal size, catwalks which form a complete "loop" over the market yards should provide an adequate view of all pens. Stairs, connecting the catwalks with the ground level, should be placed on each side of the auction barn and near both the unloading and loading docks for straight trucks and semitrailers.

Catwalks should be 3 feet wide and should be supported, above the stringers, by three 2 by 6-inch joists. The walkway may be floored either with 1 inch random width boards or 2- by 6-inch planks. In either case, boards should be spaced to provide proper drainage. Hand rails, 3 feet in height and constructed of 2 by 4-inch lumber, should be provided on each side of the walkway.

Water Troughs, Hay Racks and Grain Troughs

The number of cattle holding pens in which water troughs, hay racks and grain troughs are needed should be determined by prevailing practices in specific localities with respect to watering and feeding cattle before and after sales. As a minimum, water troughs and feeding facilities should be provided in the 4 overflow sellers' cattle holding pens. These pens would be used for holding cattle arriving the day before the sale. Water troughs also should be provided in all hog pens.

The rectangular type water trough shown in Figure 14 is suggested for cattle pens. It should be constructed of either concrete or galvanized metal, and adequate provisions should be made for draining and cleaning. Two 10-foot troughs should be placed in each of the 4 large pens.

The combination hay rack and grain trough shown in Figure 17 is suggested for cattle holding pens. Hay rack slats should be spaced 5 inches apart. The grain trough underneath should be at least 16 inches wide and 4 inches deep. For the four large pens, a total of 100 feet of hay rack and grain trough space should be provided. If the total space is equally divided among 4 pens, one 25-foot combination rack and trough should be provided for each pen.

Water troughs in hog pens may be of either precast concrete, aluminum or sheet metal. Troughs should run the full length of each pen. Adequate hydrants with threaded hose connections also should be provided in the hog section for wetting down and washing out the pens.

Yard Lights

Since considerable night work is necessary, it is suggested that the yards be adequately lighted. The yard-light system should consist of strings of 100 watt lights with shallow reflectors down the center of each row of pens and each al-

ley. Over the pens, lights should be spaced at 40-foot intervals, and those over the alleys at 20-foot intervals. The lights should be about 12 feet above ground, and well insulated against the weather. Flood lights should be provided over the loading and unloading docks and the cutting pens.

Auction Barn

Since animals are sold by the auction method, provisions should be made in the barn for: (1) sales ring; (2) auctioneer's box; (3) seating area for buyers, sellers and spectators; and (4) public address system. Although the chute used for feeding the sales ring is located in the auction barn, most markets consider it as part of the yard facilities.

The market scales also should be located in the auction barn. A small holding pen, usually referred to on Texas markets as the "kitchen pen", located in the auction barn near the exit from the sales ring, is necessary for the efficient functioning of the sale. Auxiliary facilities in the auction barn should include: (1) market offices; (2) ticket carrier system between the auctioneer's box and the office; (3) lobby with space for long-distance telephones; (4) space for a restaurant; and (5) toilets.

Sales Ring

The sales ring on a livestock auction market should be of proper size and design so that: (1) buyers may be given ample opportunity to see the animals offered for sale; (2) the desired speed or rate of selling may be maintained; (3) the efficiency of labor employed for performing the operation can be increased; and (4) both market employees and livestock will be protected from injuries. The suggested ring for the Texas market should be large enough to accommodate a large truckload of cattle without crowding the animals and small enough to handle efficiently the sale of singles. The ring should be of a size that physical handling operations in connection with sales can be performed efficiently by 2 workers. The suggested ring is crescent or semi-circular in shape. The base of the semicircle should be 32 feet wide and its perimeter, at the highest point from the center of the base, should be 12 feet deep. Entrance and exit gates, separated by the auctioneer's box, should be placed at the outer edges of the base. The entrance gates to the ring are the 3 exit gates from the multiple-type feeder chute previously described. These gates would occupy roughly 9 feet of the 32-foot base. A single 8-foot exit gate should lead onto the scale platform. The width of the exit gate should correspond to the size of scale platform. The counter of the auctioneer's box projects into the ring for a depth of 3 feet, leaving a net depth of 9 feet inside the ring.

With the exception of areas where Brahman and Brahman-cross cattle are predominant, the

fence separating the sales ring from the seating area should be 7 feet high. In areas where Brahman cattle are predominant, this height should be 8 feet. Posts for the sales ring fence should be of 2-inch galvanized steel pipe spaced at 6-foot intervals and embedded in an 8- by 24-inch concrete base. Fence rails should be of steel pipe, varying in diameter from 1½ inches for the lower rails to 1 inch for the upper rails, welded at right angles to the post to form horizontal bars. At the base of the fence, the rails should be spaced 6 inches apart and the space between bars progressively widened until the top bars are 12 inches apart.

The floor of the sales ring should be covered with sand, sawdust or wood shavings to keep dust down and provide a solid footing for livestock.

Auctioneer's Box

During a sale, the auctioneer's box is a combination office and scale house, and should provide working space for the auctioneer, starter, weigher and recorder, plus space for necessary equipment. Because of public interest in livestock sales, some markets also may find it desirable to provide space for radio broadcasts, including personnel and equipment. In addition, space should be provided for toilet facilities and a stairway to the catwalks over the yards.

The floor of the box should be of sufficient height, in relation to the ring and the seats for buyers, so that the auctioneer will have a clear view of the audience and they will have a clear view of him. The box also should afford employees working in it adequate protection from animals in the ring.

For use with the facilities previously described, the auctioneer's box should be 12 feet wide and 17 feet deep. The floor of the box should be 3 feet above the floor of the ring and its ceiling about 18 feet above the box floor, or an over-all height of 21 feet. In the center of the side facing the sales ring, a curved counter and booth 8 feet wide should project 3 feet into the ring. The top of the counter should be roughly 18 inches wide (to provide "desk space" for the starter, auctioneer and recorder) and 7 feet above the floor of the sales ring. On markets that handle Brahman cattle, the top of the counter should be at least 8 feet above the floor of the sales ring. Gates on each side of the booth enclose small areas which can be used by ringmen for protection from animals in the ring.

The scale beam should be housed in the auctioneer's box on the side adjacent to the scale platform. Windows of proper size and design to give the weigher a full and adequate view of the scale platform, and for use in directing workers in penning animals, should be provided in the box above the scale platform.

Only one door is needed in the auctioneer's box. It should be placed at the head of the stairs leading onto the catwalks. Toilet facilities, the public address system, a ticket carrier system and adequate lights complete the essential components of the auctioneer's box.

Seating Area

It is suggested that seats be provided for about 275 people. The seating area, sales ring and auctioneer's box would constitute an auditorium in which the sales ring and auctioneer's box are the "stage." Of the 275 seats suggested, about 75 normally would be occupied by buyers and about 200 by sellers and spectators. Since a relatively large number of sellers also are buyers, no exact division between the two groups is possible.

An area containing roughly 2,900 square feet should provide adequate space for a sales ring of the size previously described, 275 seats, necessary aisle space and some standing room. The floor of the seating area should rise from an elevation of about 12 inches at the ring at a rate of 15 inches for each row of seats.

Sufficient entrances and exits should be provided in the seating area to conform with State and local ordinances and regulations applicable to theatres of comparable size. As a minimum, three doors should be provided, the main entrance leading from the lobby and exits on each side of the building nearest the sales ring which will lead directly to the catwalks. Adequate provisions should be made for lighting and heating facilities.

Public Address Systems

Two public address systems are suggested for the market. One system consisting of a microphone and amplifier, is suggested for the use of the auctioneer. The second system, consisting of a microphone at the weigher's stand in the auctioneer's box with amplifiers at intervals along the main drive alley leading from the scale to the buyers' holding pens, will increase the efficiency of the "penning back" operation.

Scales

The weigh-beam or automatic-indicating type scales with a 10,000-pound weighing capacity, a 5-pound minimum graduation, a printing attachment and a 7 by 14-foot platform with drive-on and drive-off ends, is suggested. The scale platform should be located between the exit gate of the sales ring and the main drive alley leading to the buyers' holding pens so that one scale gate forms a part of the sales ring and the other gate opens on the alley. This location places the scale alongside the auction box and permits the scale beam to be placed inside the box.

The scale beam should be so arranged as to cause the weigher to face the beam and the scale

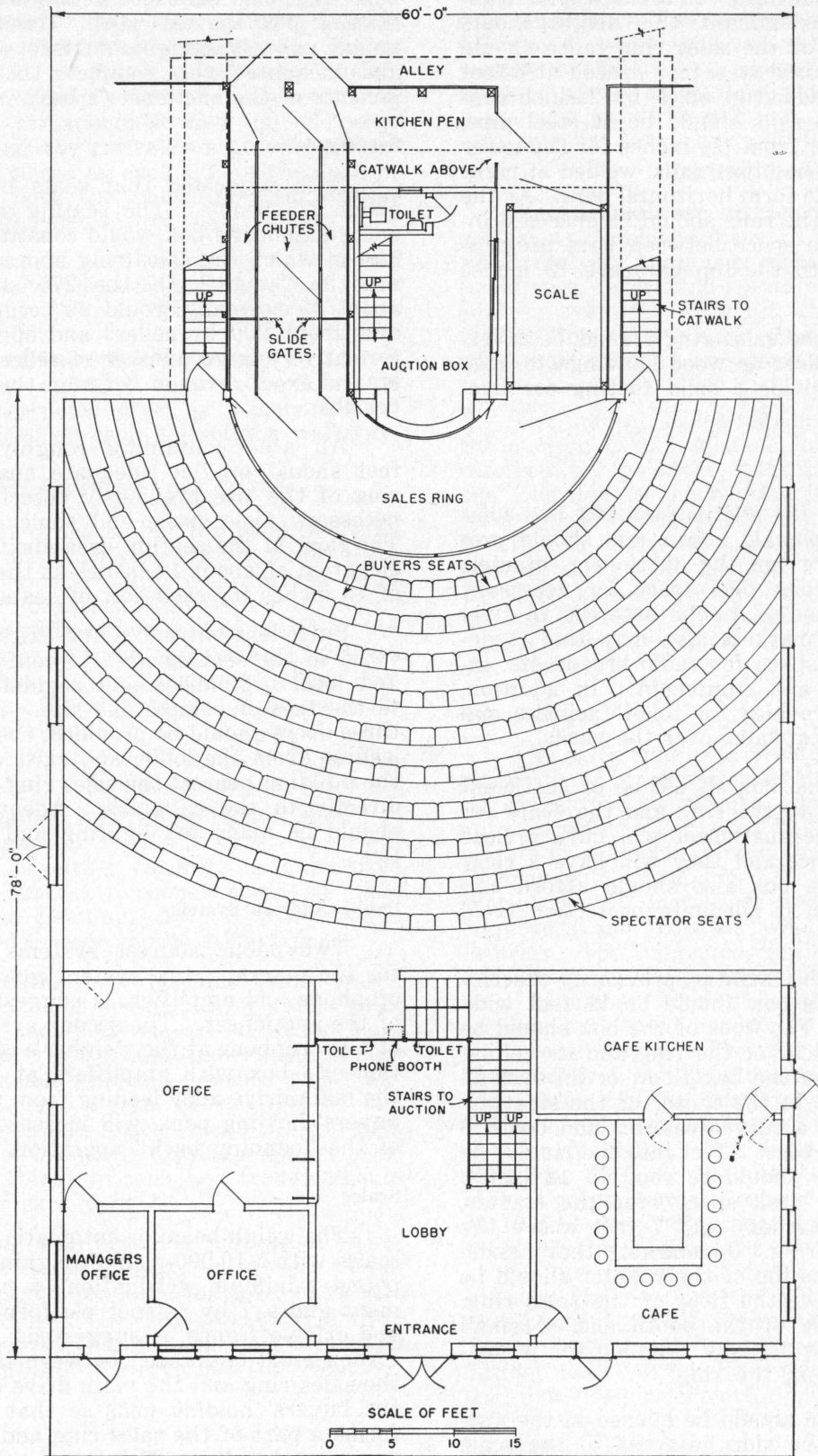


Figure 35. Floor plan of the suggested sales barn for a Texas livestock auction market.

platform when performing the weighing operation. This arrangement should place the weigher in a position to observe both the drive-on and drive-off ends of the scale platform since it is necessary for him to see that gates are closed properly and the scale platform is clear of all conditions that might interfere with obtaining accurate weights. The most desirable arrangement places the weigher in a position where sellers and buyers can observe weight determinations and recordings. The location of the scale beam should place the weigher in a readily accessible position to receive sales tickets from the ticket writer.

Kitchen Pen

The term "kitchen pen" as used on Texas markets, refers to a small holding pen located directly to the rear of the auctioneer's box between the two main drive alleys. It is used for temporarily holding animals that enter the ring out of turn or animals purchased by the market which will be resold. Its use eliminates the necessity for driving these animals back into the yards. An 8 by 12-foot pen with 8-foot gates at each end should be provided on the kind of market suggested. Fences and gates should be constructed for holding either cattle or hogs.

Market Offices

On sales days a Texas market of modal size usually has about six office employees to expedite settlements with consignors and buyers. In addition to the office space required for these workers, space also should be provided for the market manager and market owner or operator. To accommodate these employees, about 600 square feet of office space will be needed. It is suggested that this space be divided into three offices—a general office, and private offices for the manager and the market operator. Service windows, preferably between the office and the lobby, should be provided in the general office for making settlements with buyers and sellers without the necessity for their entering the office. Heating and lighting facilities should be in conformity with accepted standards.

Lobby

A lobby should serve the same purpose in an auction barn as the lobby in a commercial bank. Space should be provided in the lobby for a long-distance telephone booth, seats for market patrons, a water fountain and vending machines. Depending on the type of entrance off the lobby to the seating area and the floor levels of the lobby and auditorium, space also may be necessary for a stairway. Roughly 500 square feet of lobby space should be adequate.

Restaurant

Although most livestock auction markets conduct sales only one day each week, the con-

sensus of market operators is that space should be provided in the auction barn for a restaurant or lunch room. Most Texas markets provide space and equipment for a restaurant and attempt to sell the concession at a rate that will amortize the investment. To provide room for serving about 30 people simultaneously, and for a kitchen, about 600 square feet of floor space are necessary.

Toilets

Toilet facilities should be provided with entrances off the lobby of the auction barn. In this location, such facilities should be most convenient for market patrons during the sales.

Toilet facilities also are suggested in the auctioneer's box.

Ticket Carrier System

A ticket carrier system, connecting the auctioneer's box and the market office, is necessary for conveying the sales ticket to the office immediately after the sale of each lot. From this ticket, the consignor's returns are computed and a settlement made. One copy of the sales ticket may be handed to the buyer at irregular intervals during the sale.

The dual, overhead wire-ticket-carrier system is suggested for the Texas market because of the comparatively low initial investment required and the relatively small operating cost. A more expensive system that might prove desirable on some markets is the pneumatic tube system.

Floor Plans and Elevations

To provide adequate floor area for the components previously discussed (other than the auctioneer's box, feeder chute, kitchen and scale platform), the auction barn proper should be 60 feet wide and 78 feet deep. At the rear of the building, adjacent to the yards, an attached covered annex, 32 feet wide and 28 feet deep, provides space for the auctioneer's box, scale platform, feeder chute, kitchen pen and those sections of the catwalks leading into the barn.

Floor plans. As shown in Figure 35, the main or front entrance to the barn leads into a 17 by 30-foot lobby. A stairway at the rear of the lobby leads into the seating area of the barn, the rear floor elevation of which is 14 feet above the lobby floor. Toilet facilities and a telephone booth are respectively underneath the stair landing and seating area with entrances leading off the rear of the lobby.

On each side of the lobby are two 20 by 30-foot rooms, the one on the left of the main entrance being reserved for market offices and the space on the right for a restaurant. Office space is divided into three offices, an 18 by 20-foot general office, a 12 by 13-foot manager's office and

a 7 by 12-foot private office with an outside entrance. An outside entrance to the general office is provided by a passageway underneath the seating area. An entrance from the lobby is provided in the manager's office. A 12-foot service window, divided into 4 cages, is provided in the general office overlooking the lobby. Restaurant space is divided into a 12 by 20-foot kitchen and an 18 by 20-foot dining area. Outside entrances are provided for both the kitchen and the dining area. An entrance to the dining area also leads off the lobby.

The auditorium section of the barn is 60 feet wide and 48 feet deep. With the seating arrangement shown in Figure 35 a total of 270 24-inch theatre-type seats are arranged in 10 curved rows. Two center aisles, plus aisle space along each wall, should result in easy ingress to and egress from all seats. A comparable seating arrangement, in which 22-inch seats are used, is shown by use of a scale model in Figure 36. Where the smaller size seat is used, a total of 283 people can be accommodated.

Where the seating arrangement shown in Figures 35 and 36 is used, buyers would be expected to occupy seats in the center tier directly in front of the auctioneer's box. By grouping the buyers into this tier of seats, bids would be re-

ceived by the auctioneer from an area within an arc of from 30° to 45°. As a consequence, he should miss fewer bids than if operating over an arc of 180°. However, this arrangement would place some of the buyers farther away from the sales ring than they feel is desirable for an adequate inspection of the animals in the ring.

An alternate seating arrangement that groups 78 seats for buyers in a reserved section around the ring is shown in Figure 37. These seats are in three curved rows. Arranged in 8 straight rows 190 seats are placed toward the rear of the auditorium for sellers and spectators, making a total of 268 seats. Where this seating arrangement is used, a ramp, rather than a stairway, connects the center of the auditorium with the lobby.

Doors on each side of the sales ring lead to catwalk stairways. Where the seating arrangement shown in Figure 37 is used, these doors should be placed on the sides rather than at the end of the building, and the catwalk section shown in Figure 36 should be changed accordingly.

The auctioneer's box is immediately to the rear of the sales ring and separates the entrance gates, leading out of the feeder chute on the left, from the exit gate on the right, leading to the scale platform. The kitchen pen is immediately

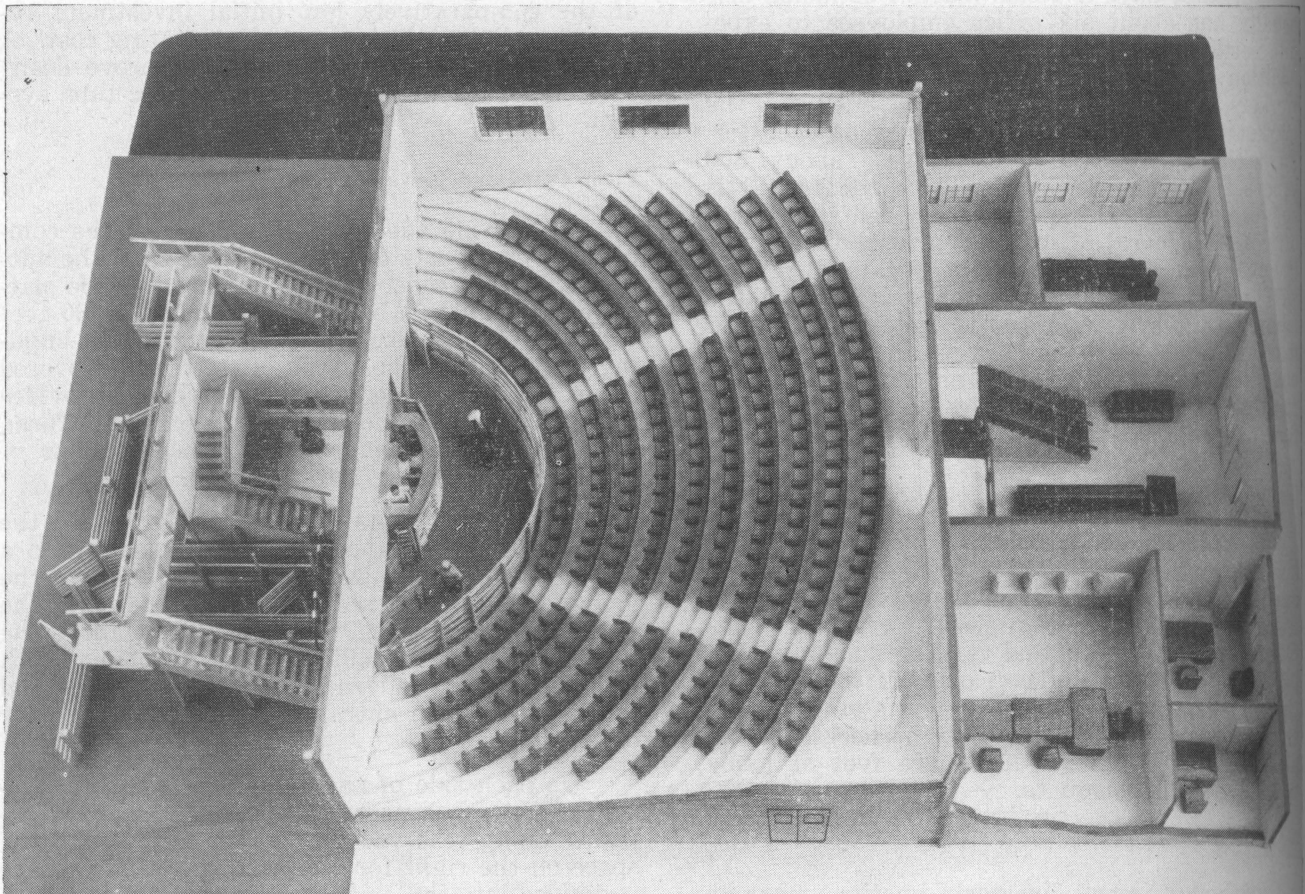


Figure 36. Cutaway view of a scale model of the suggested sales barn for a Texas livestock auction market.

to the rear of the auctioneer's box. An alley connects the scale platform with the market yards. Although these facilities are covered, only the auctioneer's box is enclosed.

Elevations. Front and side elevations of the suggested auction barn are shown in Figure 38.

Market Driveways

The principal market driveway, connecting the auction barn with the public highway and providing access to the aprons adjoining the docks and unloading pens, should be not less than 40 feet wide and should be paved so as to stand up under heavy traffic. Aprons or driveways connecting with the docks and unloading pens should be not less than 100 feet wide and should have a rolled gravel surface.

Parking Areas for Motor Vehicles

Well defined "off-street" parking areas should be provided on the market for a total of about 400 motor vehicles. These areas should be out of traffic lanes but easily accessible from them. The parking areas should be gravel surfaced, well drained, and individual spaces, 10 feet wide and 22 feet deep, should be marked plainly to facilitate parking.

Market Layout

A suggested layout for the market, which brings together the various components previously discussed, is shown in Figure 39. In this layout, the auction barn faces and is connected with the public highway that would serve the market by a 40-foot curved driveway. This driveway connects with 100-foot service driveways on each side of the yards. Parking areas are provided in front of the auction barn and along each side of the market site out of the main flow of traffic.

The auction barn connects with the yards at the appropriate drive alleys to facilitate one-way flow of animals into and out of the sales ring. Catwalks circle over the yards with stairways at each side of the auctioneer's box and one stairway each at the docks and chutes for loading and unloading.

Arrangement of Yard Facilities

Of primary importance in the yard layout is the grouping of cattle pens and the arrangement of the alleys connecting these pens with the facilities for receiving and loading out and with the sales ring. In the layout shown, sellers' cattle holding pens have been grouped in two rows along the left side of the market yards (the left side when the viewer faces the yards from the auction barn). Buyers' cattle holding pens have been similarly grouped on the opposite side of the yards. One row of dual-purpose pens for cattle, having gates opening on two alleys and a center gate for dividing the pens, occupies the center of

the yards. These pens may be assigned either to buyers or to sellers. With this pen arrangement, the flow of cattle and other species handled in cattle pens is, generally, from the left to the right side of the market and, with the arrangement of alleys shown, cross flows, back drives and out-of-line drives of animals during the three cycles of operations are minimized.

This layout also takes into account the fact that one-way traffic is necessary in all alleys to minimize mix-ups, strays, and injuries, but that animals must be moved in different directions on the yards when more than one group or cycle of operations are being performed simultaneously. Compatible with the necessity for maintaining one-way traffic, this layout minimizes the distances animals must be driven in moving into, within and out of the yards. In line with the principle of moving animals through the shortest possible distance, hog pens, which are used by both buyers and sellers, have been placed as near as possible to the sales ring and to the facilities for receiving and loading out. For the same reasons, a special dock and chute have been provided on the left side of the yards adjacent to the hog pens for loading out small truckloads of hogs.

Docks, chutes and chute pens for unloading livestock from straight trucks and semitrailers

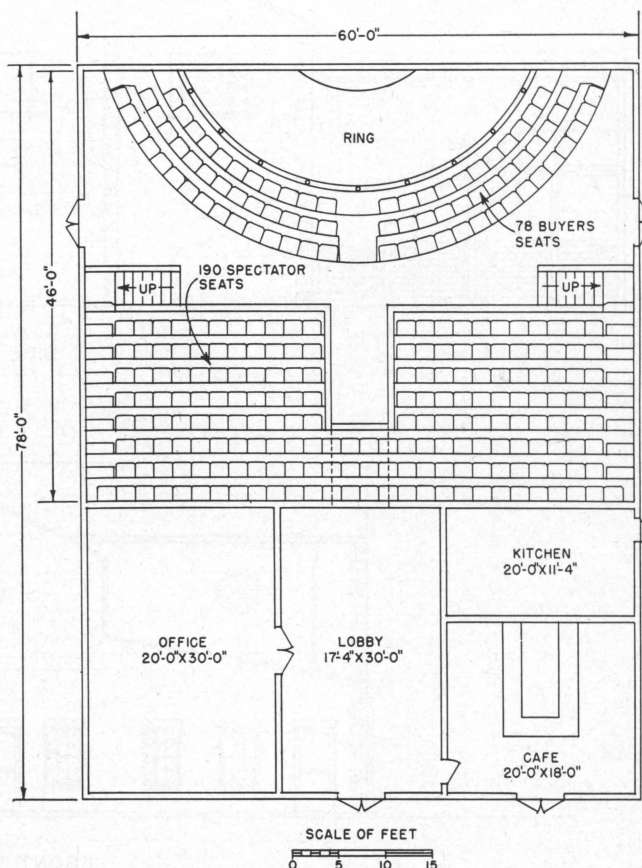


Figure 37. Floor plan of the suggested sales barn showing an alternate seating arrangement. The auctioneer's box and entrance and exit gates to the sales ring would be the same as those shown in Figure 35.

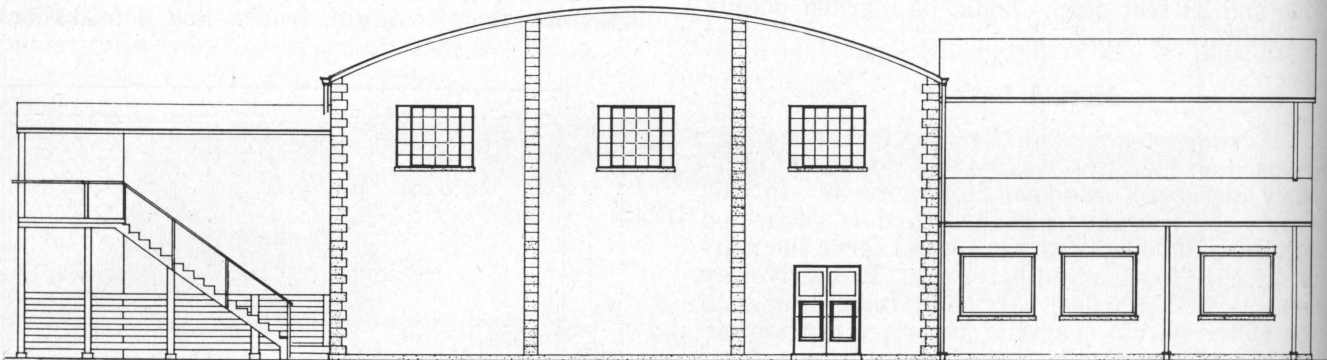
are on the left side and to the rear of the yards, adjacent to the sellers' pens. These chutes lead into catch pens connecting with the tagging chute through which all animals (other than hogs) received on the larger trucks must be driven. The tagging chute is inside of and parallels the left side of the yards leading into a cross alley. The unloading pen is outside the yards proper at the exit end of the tagging chute and leads into the same alley. This location of the unloading pen stems from the fact that animals (other than hogs) unloaded from small trucks in this pen are tagged before they are unloaded and can bypass the tagging chute.

There are at least two reasons for placing the receiving docks, chutes and pens toward the rear of the yards: (1) more space will be provided on the market driveways for trucks waiting in line to unload and there will be less likelihood of the line extending into the main market driveway or into a public highway, and (2) in the penning operations the flow of livestock generally is toward the sales ring, the direction in which they will be driven when they are brought up to the ring. These facilities project outward from, rather than being enclosed by, the yards so that

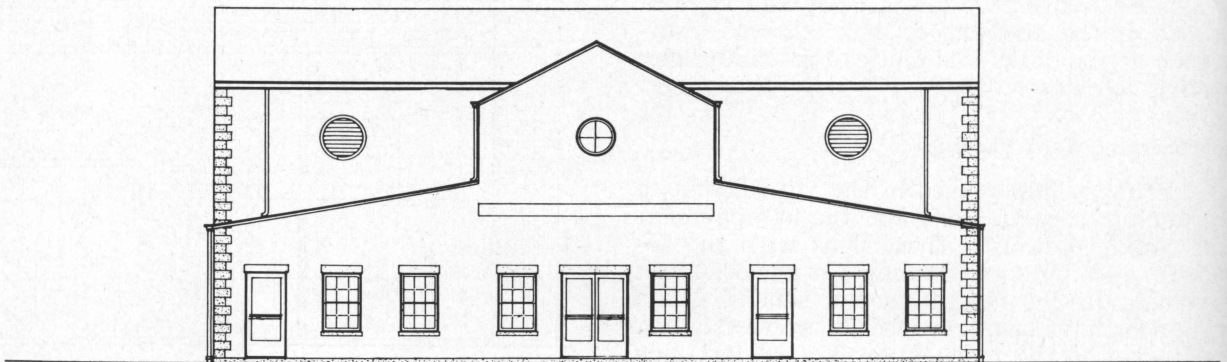
holding pens and alleys can be expanded without the necessity for moving the docks, chutes and unloading pens.

Immediately back of and connecting with each of the two chute pens used in receiving animals from straight trucks and semitrailers are 10 by 30-foot catch pens. Adjoining these pens are two smaller pens averaging in size 10- by 20-foot, one of which connects directly with and is used for driving animals into the tagging chute. Two of the catch pens have gates opening into alley No. 1 and hogs are driven through this alley to hog holding pens, bypassing the tagging chute. Otherwise all animals move through at least two of the pens to the tagging chute. One 10 by 20-foot (minus 3 feet off the depth of one pen) catch pen is on each side of the entrance to alley No. 7 from the unloading pen and animals unloaded at this point can be driven alternately into these pens or be held temporarily in the alley. Both catch pens have gates that open into alley No. 1 and animals are moved through them enroute to the holding pens.

The four loading pens connect with alley No. 5 and are so arranged that each chute will be



SIDE ELEVATION



FRONT ELEVATION

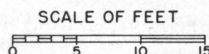
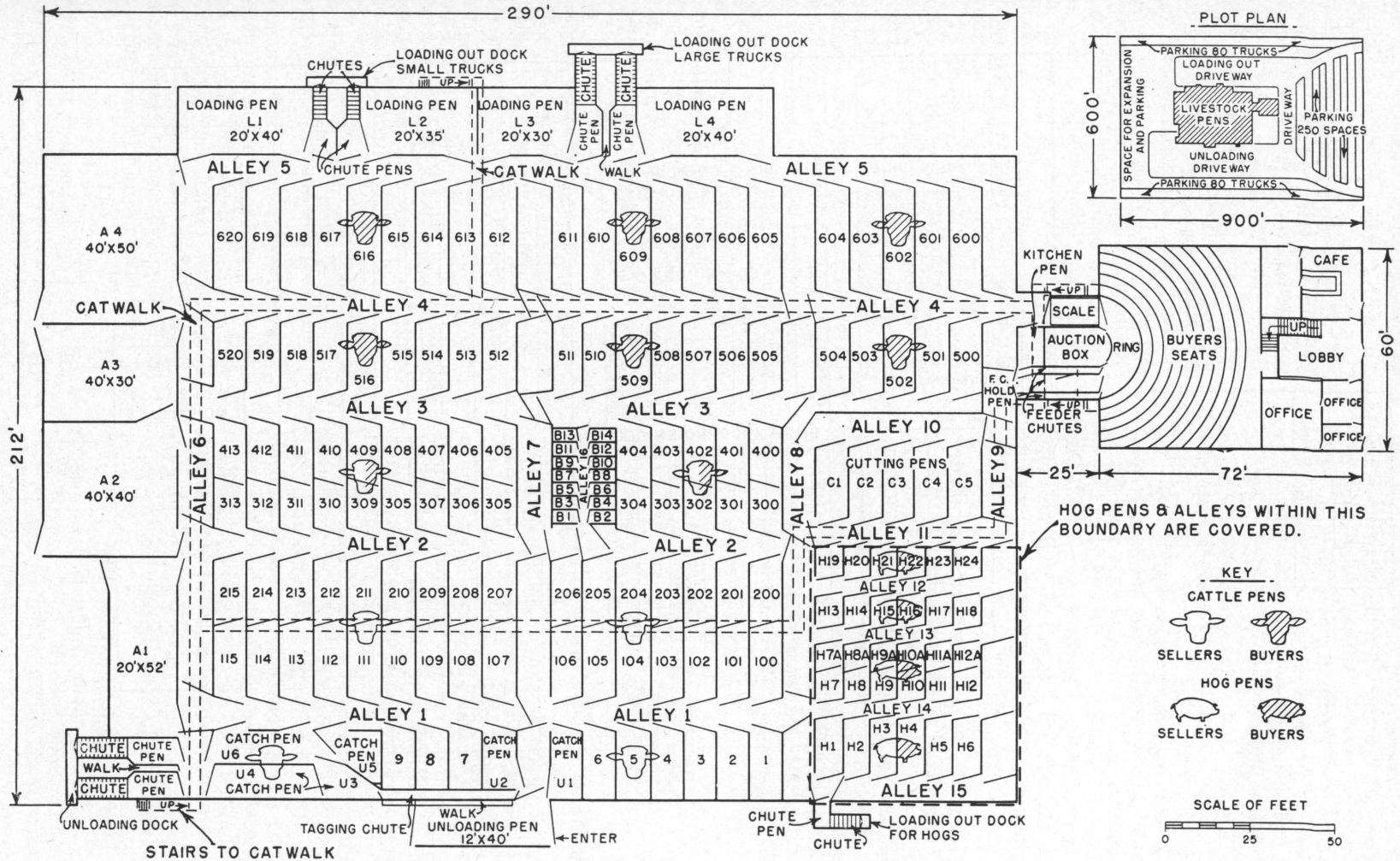


Figure 38. Front and side elevations of the suggested sales barn.

Figure 39. Suggested layout for a Texas livestock auction market handling about 700 cattle and 200 hogs during each sale. On this market, sheep, goats, horses and mules would be handled in cattle pens.



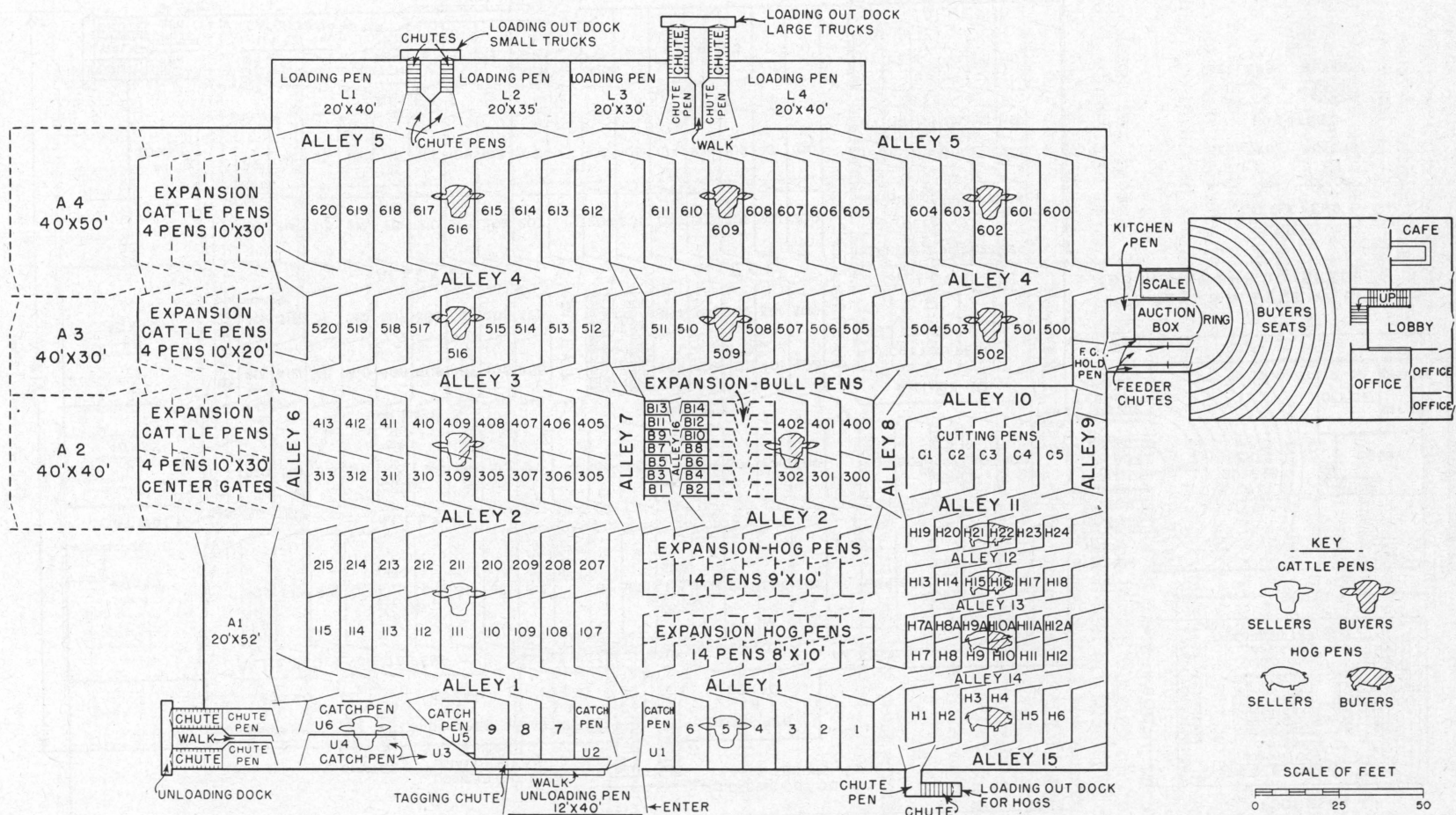


Figure 40. Layout of the suggested livestock auction market showing the possibilities for expanding yard facilities.

served by one pen. All pens are 20 feet deep. Some variation is made in the size of pens because of differences in the size of buyer loads.

With the exception of the four largest sellers' cattle holding pens, the bull pens and the hog pens, all holding pens have been arranged in 5 rows separated by alleys. All holding pens, except those in the row on the extreme left (receiving) side of the yards, open into two alleys. Pens in this row open into one alley. These pens are 10 feet wide, have 10-foot gates and open into 10-foot alleys. By this design and arrangement, the pen gates will completely block the alleys without the use of A-frames. Five main alleys run the length of the yards. Alleys Nos. 2 and 11, the latter being the cutting alley, are the principal drive alleys that would be used in bringing up animals, other than hogs, for sale. Alley No. 4 is the alley that would be used in penning back following the sale. Alley No. 5 would be used principally in loading out operations. Although 4 cross alleys, which ordinarily would not be blocked off for use as pens, are provided, cross alleys can be created at any point in the yards by opening the gates of a consecutive group of pens and thereby blocking the drive alleys. Alley No. 6 is intended primarily to serve the four largest cattle holding pens at the rear of the yards and facilitate loading out during the sale. Alley No. 7 is in the approximate center of the yards. Since the cattle tagging chute and unloading pen open into this alley, it with alleys Nos. 1 and 2, would be used for penning animals during receiving operations. Alleys Nos. 8 and 9 are the principal drive alleys for hogs.

The 5,840 square feet of space suggested for 4 large overflow sellers' cattle holding pens have been divided with a view toward having as many as possible of the pen gates open at the head of the main drive alleys leading to or from the sales ring. The arrangement shown in Figure 39 also would permit these pens to be divided into smaller pens of the sizes immediately adjacent to them, and the alleys to be extended, with no revision in the basic layout. Access gates should be placed in these pens to allow vehicles to enter the yards for cleaning purposes and for handling feed.

The 14 bull pens and the alley into which they open occupy the same amount of space in the center of the yards as that occupied by two 10 by 30-foot cattle holding pens. These pens are 4 feet wide, have 4-foot gates and open into a 4-foot alley. This section of the yards could be expanded by converting 2 additional cattle pens to bull pens.

Hog pens have been grouped at the left front section of the yards near the sales ring. These pens are 8 feet wide, have 8-foot gates and, with the exception of the pens adjacent to alleys Nos. 11 and 15, open into 6-foot alleys.

In the layout shown in Figure 39, pens have been numbered so they can be located quickly.

Hog pens are numbered in sequence, H-1 to H-24. Bull pens also are numbered in sequence, B-1 to B-14. Cattle holding pens are numbered to indicate the row in which a pen is located and its approximate position in the row. The sections of pens divided by center gates have been numbered as separate rows so that, in the pen numbering system, there are 7 rather than 5 rows of pens.

Expansion of Yard Facilities

To expand or increase the size of the yards, additional pens and alleys would be constructed at the rear of yards. This would increase the depth of the yards, with no increase in width. By expanding in that direction, the same flow lines could be maintained and the facilities for loading and unloading trucks could remain in their present locations.

A suggested expansion of yard facilities is shown in Figure 40. Hog holding pens would be expanded by converting 7 of the adjoining 10 by 40-foot cattle pens to seven 8 by 10-foot and seven 9 by 10-foot hog pens, all with center gates. The remainder of the cattle pen space would be converted to a 6-foot alley. Bull pens would be expanded by taking over the 10 by 30-foot cattle pens and would provide space for 14 additional pens.

As a first step in expanding cattle holding pens, 3 of the large pens at the rear of the yards would be divided into smaller pens, and new pens of the larger size could be added.

Amount of Land Needed for Market Site

The market layout shown in Figure 39 is on a site 600 feet wide and 900 feet deep, which contains roughly 12.5 acres. This width and depth cannot be materially decreased if the suggested market layout is to be maintained. To obtain the necessary depth required for this layout may, in a few instances, necessitate the buying of more "frontage" than is needed. However, the reverse usually will be true, particularly where sites are along important highways. The cost of the land, placed in condition to build, must be added to the estimated cost of constructing the facilities to determine the total market cost. Because of variations in land costs in different localities, no estimate of that item is made in this report.

Estimated Cost of Construction

The cost estimates used in this section are based on the index of construction costs in Dallas, Texas, as of October 1952. These estimates are presented only as a guide for use by market operators in estimating the total market cost and the prospective investment that might be required to construct a facility of the kind and size suggested. These estimates are not intended to replace the estimates of local contractors made at

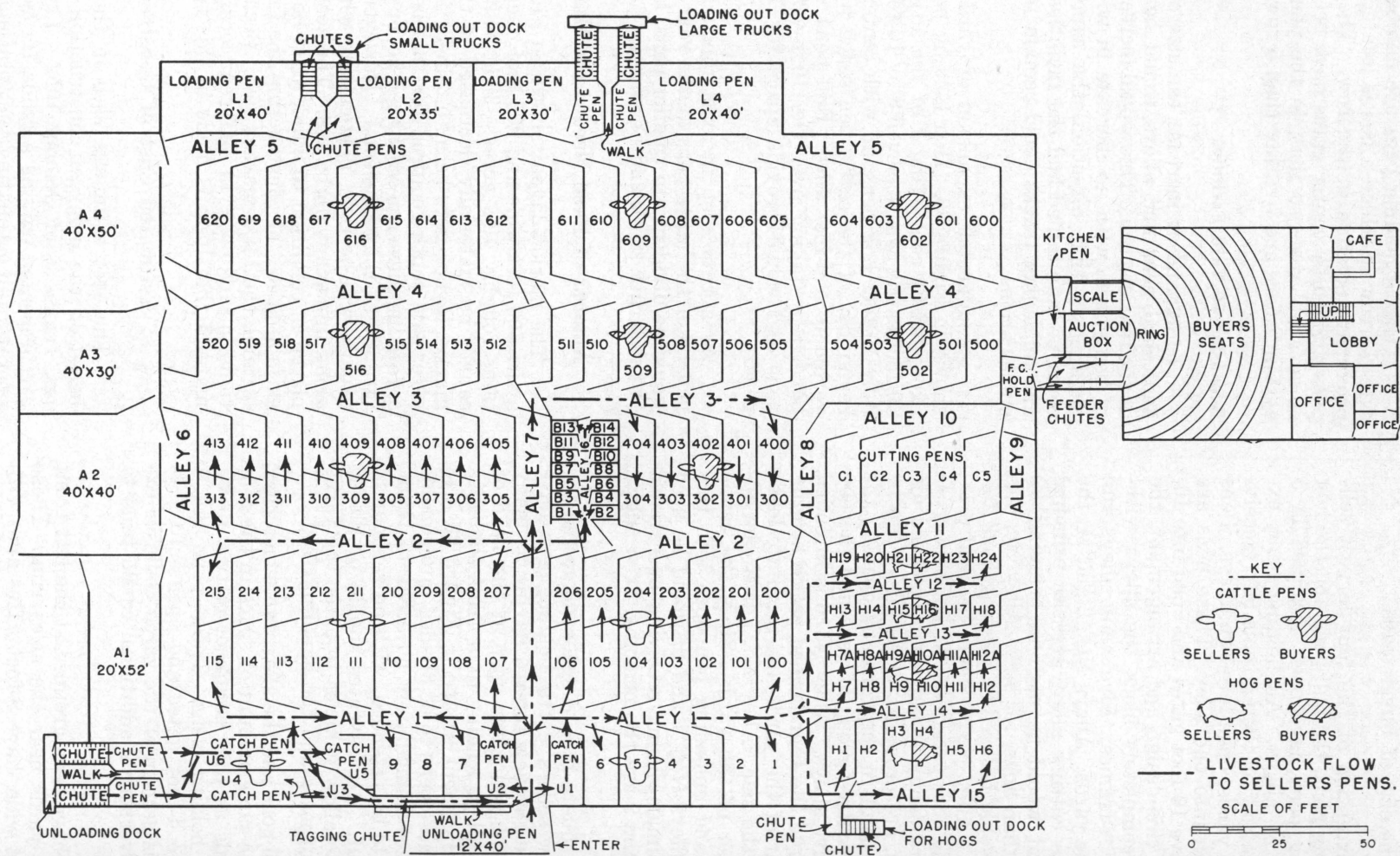


Figure 41. Flow diagram of receiving operations on the suggested Texas livestock auction market.

the time and place where construction may be undertaken.

An estimate of the cost of constructing the facilities previously described is:

Item	Dollars
Docks, chutes and unloading pens.....	2,100
Cattle pens:	
Fences and gates 5 ft. high, 5-2- by 6-inch rails, 6- by 6-inch posts	
7,000 lin. ft. @ \$2.00 per ft.....	14,000
Hay racks and feed troughs	
100 lin. ft. @ \$2.00 per ft.....	200
Water troughs—concrete or galvanized sheet metal	
8 troughs—10 ft. long.....	240
Paving alleys (black top).....	5,000
Hog pens:	
Fences and gates, 3 ft. 6 in. high, 4-1- by 10-inch rails	
4-1- by 6-inch rails, 906 lin. ft. @ \$1.55 per ft.....	1,500
Water troughs, concrete, 240 lin. ft.....	360
Paving pens and alleys, 4-inch concrete, 477 sq yds.....	950
Roof over hog pens, 74- by 58-ft.....	1,500
Catwalk over yards, including 4 stairways.....	1,600
Yard lighting.....	600
Feeder chute, multiple type.....	500
Auction barn, brick and concrete with frame roof trusses, 4,680 sq. ft. floor space ¹	30,000
Scale, 7- by 14-ft. platform.....	3,000
Seats, 270, theatre or school auditorium type.....	2,200
Public address systems, 2 systems @ \$500 ea.....	1,000
Ticket carrier system.....	150
Water lines in cattle and hog pens, cafe, and toilets.....	2,100
Sanitary sewers (inside market area).....	700
Paving:	
Driveways (oil rock—1,300 sq. yds.).....	7,700
Aprons and parking areas (gravel surface 12,950 sq. yds.).....	7,700
Subtotal.....	75,400
Engineering fees at 6 percent.....	4,524
Total cost of market without roof over cattle pens.....	79,924
Roof over cattle pens.....	11,500
Architect and engineering fees at 6 percent.....	690
Total cost of roof.....	12,190
Total cost of market including roof.....	92,114

¹Estimate includes all electrical work, lighting fixtures, plumbing and toilet facilities, gas unit heaters and exhaust fans; but does not include office and restaurant equipment.

Obviously there should be a number of possibilities for reducing these estimates. Such possibilities should be investigated by the market operator who contemplates a construction program. As an illustration, the cost of cattle pen fences and gates might be reduced by about 50 cents per foot, or a total of about \$3,500, by using rough-sawn air-dried lumber purchased locally.

HOW THE SUGGESTED FACILITY SHOULD OPERATE

The pen and block gates on the suggested facility are swung so that definite flow lines must be observed during the three major cycles of operations if the facility is to operate efficiently. These lines are shown by flow diagrams in the sections that follow. Other flow lines would be possible by swinging some of the pen gates differently. Market operators who revise the basic layout to fit a special tract of land, or for other reasons, should determine which lines of flow will be most efficient before deciding in which direction pen and block gates should be swung.

Receiving Operations

The principal flow lines during receiving operations are shown in Figure 41. Cattle, other than bulls, unloaded in the unloading pen are driven into one of the catch pens (U-1 and U-2) at the entrance to alley No. 7 until the pen has been filled. Each of these pens will hold about 5 or 6 small truckloads. When one pen has been filled, all animals in the pen are driven to and penned in the sellers' holding pens. Hogs, goats, sheep, bulls, horses and mules are driven directly from the unloading pen to the holding pens, thus bypassing the catch pens. All animals unloaded at the docks move directly into one of the larger catch pens (U-4 or U-6) back of the docks. Cattle may be driven from these pens into one of the smaller pens (U-3 or U-5) and then into the tagging chute. Other species are driven from the first catch pen into alley No. 1 and then to sellers' holding pens.

The sellers' cattle pens most distant from the docks and unloading pen are the first to be filled. If pens 305 to 313 and 405 to 413, are to be used for sellers' pens, pens 405 to 413 should be among the first filled. Animals yarded in pens 405 to 413 are driven up alley No. 7 into alley No. 2 and into the assigned pen. Because of the direction in which the gates are swung, pens 300 to 304 and 400 to 404 must be filled through alley No. 3. All pens in this row should be filled before the sale begins so that alley No. 2 will be unimpeded for bringing up animals to the ring. The last pens to be filled are those opening into alley No. 1.

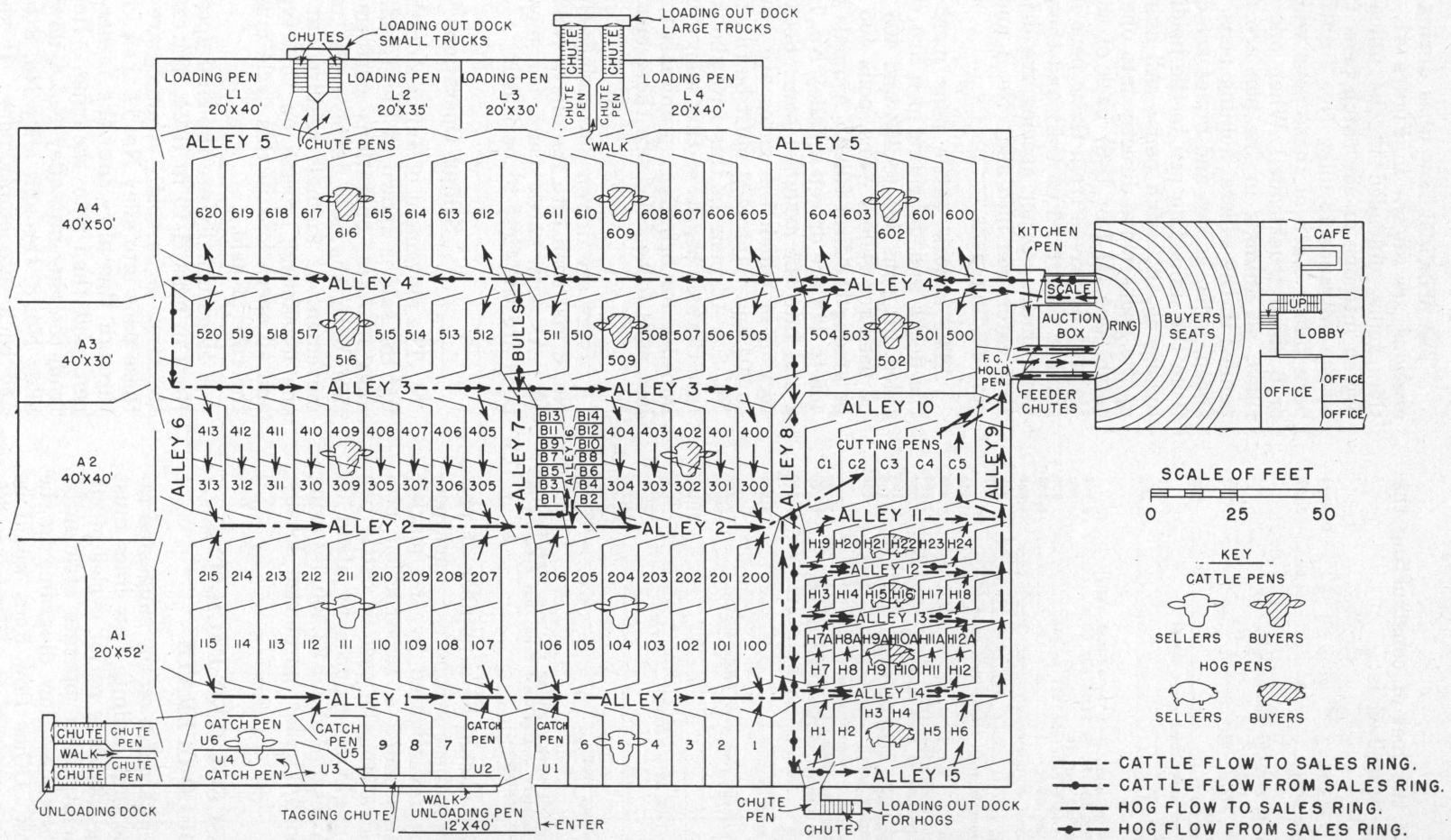
Hogs are driven down alley No. 1 into alley No. 8 and then into the alleys Nos. 12, 13, 14 or 15. As with cattle pens, the most distant hog pens are the first to be filled.

Selling Operations

The movement of animals on the market during the sale is shown in Figure 42. As the flow lines indicate, operations performed in connection with the sale involve the most extensive movement of animals required at any stage of the marketing process on this type of facility, and all operations in this cycle must be keyed to the rate of sale.

Hogs usually are the first species to be sold. Hogs in pens H-19 to H-24, nearest the ring, are the first to be sold. Animals are driven out of these pens into alley No. 11 then into alley No. 9, through this alley into the feeder-chute holding pen, and then into the ring. Hogs are driven from the ring into alley No. 4, down this alley to alley No. 8, through alley No. 8 to alley No. 12 and back into empty pens. It should be noted that the animals leave the pens through the alley on the side nearest the ring and return through the alley on the opposite side of the pens.

The first cattle to be received and penned, which are the cattle in pens opening on alley No.



- Figure 42. Flow diagram of selling operations on the suggested Texas livestock auction market.

2, are the first to be sold. From these pens animals are driven down alley No. 2 into alley No. 11, the cutting alley, through the cutting pens to alley No. 10 and into the feeder-chute holding pen. From the ring, cattle, other than bulls, are driven down alley No. 4 to the buyers' pens. Buyers' pens are assigned before and during the sale and animals must be penned in the proper pen regardless of its location along the alley. Buyers are assigned pens either in the 500 to 520 row or in the 600 to 620 row. If additional pens are needed by buyers, they are assigned pens in the 400 to 413 row. To avoid the need for two or three additional pen-back men, cattle are first penned as they are sold in the 500 and 600 series pens and, as these pens are filled, the entire pen lot is moved to a pen in the 400 series. Animals in the 600 series pens are moved out through alleys Nos. 5 and 6 to alley No. 3 and through this alley to the 400 series pens. From alley No. 4, bulls are driven down alley No. 7, into alley No. 2 and back into alley No. 16.

Loading-out Operations

A flow diagram of loading-out operations is shown in Figure 43. With the exception of hogs loaded onto buyers' trucks in mixed lots with other species, the physical handling involved in loading-out operations requires fairly short and direct drives of animals in relatively large lots.

Animals penned in pens 600 to 620 are driven either through alley No. 5, which is not used during the sale, to the loading pens (L-1 to L-4), or directly to the loading docks. Animals penned in pens 500 to 520 are driven through alleys Nos. 3, 6 and 5, to the loading pens or docks. Alley No. 4 the pen back alley during the sale is not used with loading-out operations.

Small lots of hogs are loaded out at the single-chute dock for small trucks on the left side of the yards. Hogs are brought through the feeder alleys into alley No. 8 and then to the dock. When hogs are loaded on large trucks, they are driven through alley No. 8 to alley No. 5, and then to the loading docks.

Operations in the Auctioneer's Box

A major consideration in obtaining efficiency in sales operations is the proper arrangement of workers in the auctioneer's box. An arrangement that has proved desirable on a number of markets is to have the starter stationed adjacent to the inlet gate, the auctioneer next, the checker and the scale ticket writer on the side of the box nearest the outlet gate. The weighmaster is stationed near the ticket writer at the beam of the scale. When a radio broadcast is performed, the announcer is slightly to the rear and between the starter and the auctioneer (Figure 36).

Since the starter must place his bid on an animal as quickly as possible after it enters the

ring, he should be located in the side nearest the inlet gate. This position enables him to see the animal as it enters the ring and make a rapid appraisal of its value. The auctioneer should be near the starter so that he can pick up the starting price without delay. He also needs to be near the center of the box so that he can command the attention of the bidders. He should be stationed where he has an unobstructed view of the entire seating area and be in a position to keep complete control of the sale at all times. The other worker who must have an unobstructed view of the ring is the checker or clerk whose responsibility is to observe the animal's tag number as it enters the ring. The sale ticket writer records the sellers' name, the buyers' name and the price at which the animal is sold. After the ticket writer records this information he hands the scale ticket to the weighmaster. The weighmaster weighs the animal, stamps the weight on the scale ticket, assigns the animal to a pen and records the pen number. In group sales, he also records the number of animals sold in each group.

Radio broadcasting of livestock sales is becoming more widespread. Markets that do broadcast are on the air for relatively short periods, thus requiring only a limited amount of an announcer's time. Since these broadcasts have no direct effect on the efficiency of the sale, the announcer does not need as prominent a position in the auctioneer's box as the regular employees. The announcer usually talks between sales and places his microphone before the auctioneer during sales, which requires a location that will be out of the way of and yet near the auctioneer. For this reason, the radio announcer is stationed between and slightly to the rear of the auctioneer and the starter.

Labor Requirements

The suggested market would handle approximately the same volume of livestock and perform about the same operations as the market for which labor requirements were shown previously. As a basis for making comparisons in labor requirements on sales days, it is assumed that the suggested market would maintain about the same period of operations on sales days.

The total number of workers, other than the office crew, that would be required to operate the suggested market on sales days is 23, or 4 fewer workers than the number required on the "typical" market. This reduction in workers is made possible through improved design and layout of the market facilities. Table 6 shows the number of workers required to perform each group or cycle of operations—receiving, selling and loading-out—before, during and after the sale.

Thirteen workers would be required for receiving livestock on the suggested market before the sale is started, as compared with 14 for the typical market. The worker eliminated from the

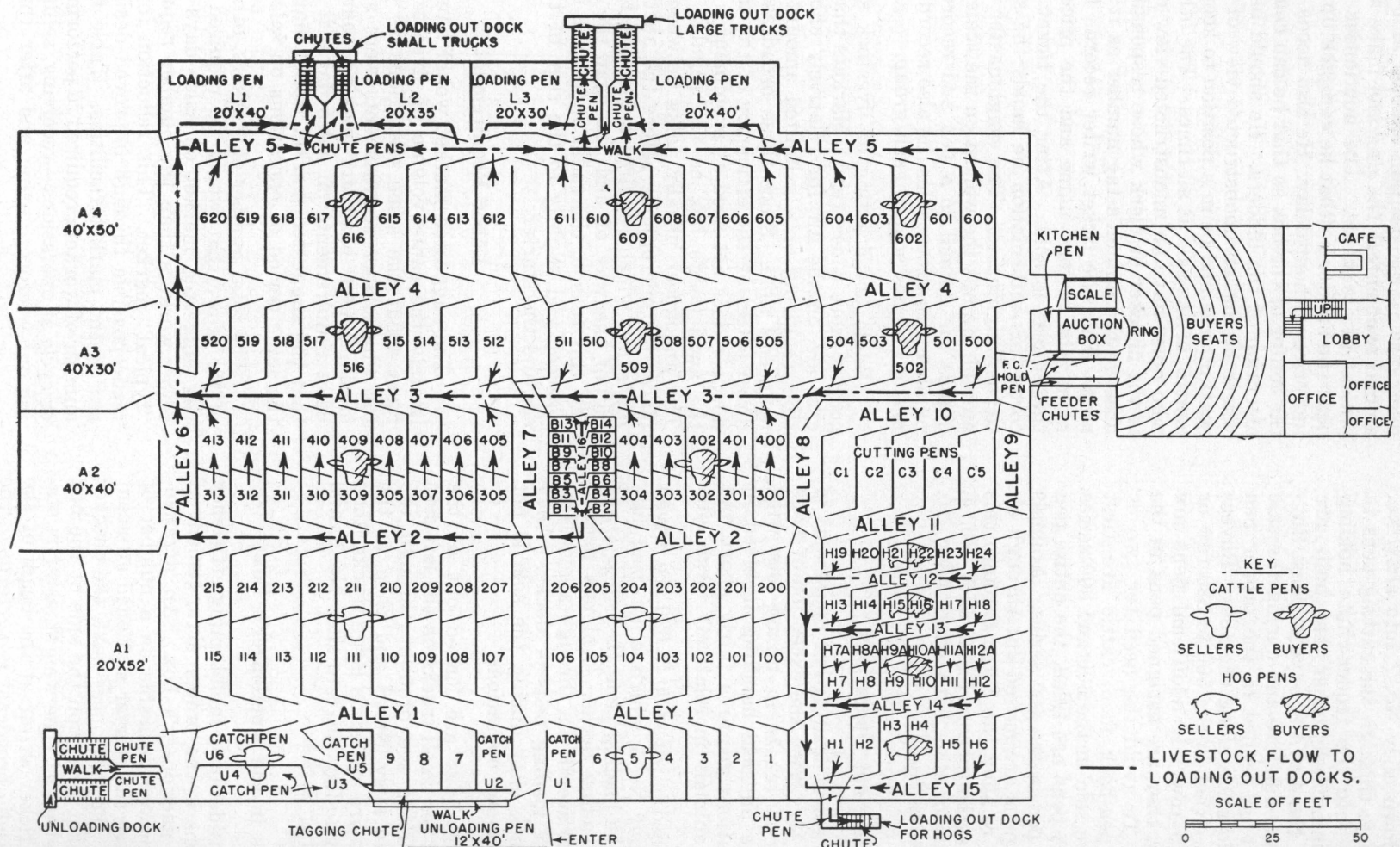


Figure 43. Flow diagram of loading-out operations on the suggested Texas livestock auction market.

receiving crew assisted in performing unloading and penning operations on the typical market. This reduction is possible through the improved design and layout of the unloading facilities, which provide for a free flow of livestock from the unloading facilities to sellers' pens. The same number of workers would be required to prepare receiving tickets and perform tagging operations. At the start of the sale on the suggested market, 11 workers would be shifted to operations in the selling cycle and 2 workers would remain to perform receiving and loading out operations during the sale.

Twenty workers would be required to perform operations in the selling cycle on the suggested market. Of these, 11 workers would be obtained from the receiving crews and 9 would report for duty when the sale starts. The number of workers required to perform operations in this cycle would be 4 less than the number required on the typical market. The reduction in the number of workers needed is in the yard and ring men. The multiple type feeder chute and its location in relation to the cutting pens, make it possible for 3 workers to drive animals from the cutting pens into the sales ring. Four workers perform this job on the typical market and some markets use as many as 6 men. The sales ring on the suggested market is designed so that it should be possible for 2 ring men to drive animals through it as quickly as the 3 men required

on the typical market. The straightaway alley from the sales ring to the buyers' pens on the suggested market should afford pen back workers a clear view of the animals as they leave the scale and will enable them to yard animals in buyers' pens more efficiently than when their view is obstructed, as is now the case in many markets. One scale gate man should be able to remove the livestock from the scale platform. The pens of 10-foot width should enable workers to cover more pens than are covered on the typical market where pens are 10, 15 and 20 feet in width. Thus, 5 workers should be able to yard livestock in buyers' pens on the suggested market as compared with 6 on the typical market. The number of workers required for bring-up operations, auctioneering, starting, checking, writing the sales ticket and cutting are the same for both markets. At the conclusion of the sale, 8 yard men would be shifted to checking operations in the loading-out cycle.

The same number of workers would be needed to check animals in buyers' pens on the suggested market as on the typical market, since this operation should be performed as quickly as possible after the sale. However, 8 workers should be able to perform this operation on the suggested market in a shorter period because pens are accessible from either side and adequate block gates and space in alleys are available to these workers. These features should make it possible for a worker to perform checking operations without interference from other workers performing similar operations, or from workers driving livestock to loading docks. When checking has been completed, 6 workers are relieved from duty and 2 are assigned to driving livestock from buyers' pens to the loading docks.

Table 6. Estimated number of workers that would be required on the suggested market on sales days to perform specified operations before, during and after the sale¹

Cycle of operations	Workers employed ²		
	Before sale	During sale	After sale
	Number	Number	Number
Supervisory personnel			
Yard foreman	1	1	1
Receiving livestock:			
Preparing receiving ticket	2	1	
Tagging	2		
Unloading and penning livestock	9	1	
Total	13	2 ³	
Selling livestock:			
Bringing up livestock for sale		1	
Cutting livestock		3 ⁴	
Driving livestock from cutting pens into sales ring		3	
Ring men		2	
Auctioneering		1	
Starting price		1	
Ticket writer		1	
Checker		1	
Weigher		1	
Scale men		1	
Yarding livestock in buyers' pens		5	
Total		20	
Loading out livestock:			
Checking buyers' livestock and driving livestock to loading docks		2 ³	8
Driving livestock to loading docks			2
Total		2	8 ⁵
Total number of workers		23	

¹The labor force shown is primarily for cattle operations.
²Excludes office personnel.
³These workers perform all receiving and loading out operations during the sale.
⁴When the cutting operation is not performed, the market may operate with a total of 20 workers.
⁵Two who drive livestock to the loading docks are included in the total of 8 men performing the "checking of buyers' pens and driving livestock to the loading docks."

Assuming that the 4 men eliminated work 10 hours a day on the typical market, the minimum for most yard men, the savings in labor on sales days on the suggested market would amount to 40 man-hours. Possible savings in labor on checking operations are estimated at 4 man-hours. Thus, the suggested market should require 44 fewer man-hours of labor per sales day than the typical market of comparable size. On the basis of an assumed wage rate of \$1 per hour, the savings on labor would amount to \$44 per sale or, with 50 sales annually, an annual savings of \$2200. Markets operating 2 days each week, or conducting 100 sales annually, should have an annual saving of \$4400.

In addition to the possibilities of operating with a smaller labor force, the suggested facility should:

1. Reduce the amount of time sellers' trucks spend waiting to be unloaded, which means that livestock will spend less time on trucks and trailers, and that there will be less shrinkage and fewer death losses.

2. Increase the rate at which buyers' trucks can be loaded, an important consideration with most buyers, and an inducement for them to deal with the market.

3. Make the recruiting of labor less difficult and permit closer supervision over the workers.

4. Assure an uninterrupted flow of livestock into the ring.

5. Make possible the assignment of more separate pens for individual consignors, a service that is often requested but difficult to give on some existing markets, and assure a more efficient utilization of pen space.

APPENDIX

LIVESTOCK AUCTION MARKETS OPERATING IN TEXAS, FEBRUARY 1953¹

County	Name of auction	Town	Sale day	County	Name of auction	Town	Sale day
Austin	Sealy Auction Co.	Sealy	Wed.	Lamar	Paris Comm. Co.	Paris	Thurs.
Bailey	Muleshoe LS Co.	Muleshoe	Wed.	Lampasas	Lamar County LS Comm.	Paris	Wed.
Bastrop	Colorado Valley Comm. Co.	Smithville	Tues.		Lometa Comm. Co.	Lometa	Fri.
Baylor	Seymour Comm. Co.	Seymour	Fri.	Lavaca	Lampasas Comm. Co.	Lampasas	Wed.
Bee	Bee County LS Auction	Beeville	Mon.	Hallettsville	Hallettsville Auct. Co.	Hallettsville	Mon.-Tues.
Bell	Temple LS Auction	Temple	Tues.-Thurs.	Leon	Buffalo LS Auction	Buffalo	Sat.
Bosque	Clifton LS Commission	Clifton	Wed.	Liberty	Cleveland Auct. Co.	Cleveland	Wed.
Bowie	Walnut Spgh. Sale	Walnut Springs	Thurs.	Limestone	Groesbeck LS Comm.	Groesbeck	Thurs.
Brazos	Owen Brothers H&M Co.	Texarkana	Fri.	Live Oak	Three Rivers LS Comm.	Three Rivers	Wed.
Brown	Bryan LS Commission	Bryan	Tues.	Lubbock	Lubbock Auct. & Comm.	Lubbock	Tues.-Thurs.
	Brownwood LS Auction	Brownwood	Wed.				
	Eads & Cole Comm. Co.	Brownwood	Thurs.	McCulloch	Heart of Texas Comm.	Brady	Tues.
Caldwell	Adams Auction Sale	Lockhart	Thurs.		Brady LS Comm. Co.	Brady	Sat.
Cameron	Arroya Sale Yard	San Benito	Tues.	McLennan	MacArthur Comm. Co.	Waco	Mon.-Wed.
Camp	Pittsburg LS Commission	Pittsburg	Thurs.	Madison	Leggett LS Auction	Waco	Fri.
Cass	Morris & Son	Douglasville	Wed.	Mason	Madison County LS Comm.	Madisonville	Wed.
	Hughes Spring LS Comm.	Hughes Spring	Fri.	Matagorda	Mason Sales Co.	Mason	Thurs.
Cherokee	Jacksonville Auction Sale	Jacksonville	Sat.	Medina	Gulf Coast LS Comm.	Bay City	Thurs.
Childress	Childress LS Commission	Childress	Wed.	Milam	Hondo LS Auct. Co.	Hondo	Wed.
Coleman	Coleman LS Commission	Coleman	Mon.	Mills	Midland LS Auction	Midland	Thurs.
Collingsworth	Wellington LS Commission	Wellington	Mon.	Mitchell	Milam County LS Comm. Co.	Cameron	Sat.
Colorado	Columbus LS Commission	Columbus	Thurs.	Montague	Mills County Comm.	Goldthwaite	Mon.-Fri.
Comanche	McDougal Barn	Comanche	Sat.		Mitchell County LS Auction	Colorado City	Sat.
Cooke	Muenster Auction Barn	Muenster	Sat.		Nocona Sales Barn	Nocona	Thurs.
	Gainesville Auction Sale	Gainesville	Mon.	Nacogdoches	Patton Auction Barn	Nacogdoches	Fri.
	Gatesville Comm. Co.	Gatesville	Sat.	Navarro	Navarro County Comm.	Navarro	Tues.
Coryell	Evant Comm. Co.	Evant	Thurs.		Corsicana Auct. Co.	Corsicana	Sat.
					Webster Auct. Co.	Sweetwater	Wed.
Dallas	Carrollton Comm. Co.	Carrollton	Fri.		Robstown LS Commission	Robstown	Thurs.
	Mesquite Comm. Co.	Mesquite	Sat.				
Dawson	Lamesa Auction	Lamesa	Mon.	Ochiltree	Perryton Sale Co.	Perryton	Fri.
DeWitt	Cuero LS Comm. Co.	Cuero	Fri.				
Eastland	Sig Faircloth LS Comm.	Eastland	Tues.	Palo Pinto	Palo Pinto LS Comm.	Mineral Wells	Sat.
	Cisco LS Commission	Cisco	Fri.	Panola	Carthage Auction Sale	Carthage	Tues.
Ellis	Ennis LS Commission	Ennis	Wed.	Polk	Livingston LS Exchange	Livingston	Sat.
	Hill Bros. Sales Barn	Midlothian	Tues.	Potter	Amarillo LS Auction	Amarillo	Mon.-Tues.
El Paso	Waxahachie LS Auction	Waxahachie	Fri.		Farmers LS Auct. Co.	Amarillo	Sat.
Erath	Producers' LS Auction	El Paso	Tues.				
	Stephenville LS Comm.	Stephenville	Wed.	Rainey	Young & Adams	Emory	Tues.
Falls	Falls County LS Auct. Co.	Marlin	Mon.	Robertson	Calvert LS Comm.	Calvert	Fri.
Fannin	Bonham LS Comm. Co.	Bonham	Fri.	Runnels	Ballinger Auct. & Comm.	Ballinger	Thurs.
Fayette	Schulenburg LS Comm.	Schulenburg	Wed.		Winters Auction Barn	Winters	Wed.
	Flatonia LS Commission	Flatonia	Mon.	Rusk	Henderson Auct. Sale	Henderson	Mon.
	LaGrange LS Commission	LaGrange	Fri.				
Frio	Frio County Comm.	Pearsall	Thurs.	Sabine	Sabine County Auct. Barn	Hemphill	Thurs.
				San Augustine	San Augustine LS Auction	San Augustine	Mon.
Gillespie	Gillespie Comm. Co.	Fredericksburg	Wed.	Shelby	Center LS Auction	Center	Wed.
Gonzales	Gonzales LS Comm. Co.	Gonzales	Sat.	Smith	Smith County Auct. Barn	Tyler	Tues.-Fri.
Grayson	Howe LS Commission	Howe	Fri.		Tyler LS Comm. Co.	Tyler	Wed.-Sat.
Gregg	Longview LS Exchange	Longview	Thurs.	Stephens	Breckenridge LS Auction	Breckenridge	Thurs.
Gundalup	Seguin LS Auction	Seguin	Wed.	Swisher	Tulia LS Auction	Tulia	Fri.
Hale	Plainview LS Auction	Plainview	Wed.	Tarrant	Arlington Auction	Arlington	Thurs.
Hall	Hall County Comm. Co.	Memphis	Thurs.		Grapevine Auction	Grapevine	Tues.
Hamilton	Hamilton Commission	Hamilton	Tues.		Crowley Auction	Crowley	Mon.
	Hico Comm. Co.	Hico	Mon.	Taylor	Abilene LS Comm.	Abilene	Tues.-Thurs.
Hardeman	Quanah LS Commission	Quanah	Fri.		Ranchers' & Farmers' LS Commission	Abilene	Mon.-Fri.
Harris	N. Houston Stockyards	Houston	Fri.	Titus	O. L. Colley Comm. Co.	Mt. Pleasant	Tues.
	Gray Auction Co.	Hockley	Thurs.	Tom Green	Producers' LS Auction	San Angelo	Tues.-Fri.
Harrison	Marshall LS Exchange	Marshall	Mon.		San Angelo Auction	San Angelo	Mon.-Sat.
Hartley	Dalhart Weekly LS Auction	Dalhart	Tues.	Travis	Capitol Auction Co.	Austin	Mon.
Hays	Green Valley LS Auction	San Marcos	Thurs.	Trinity	Groveton LS Comm.	Groveton	Thurs.
Henderson	Athens Comm. Co.	Athens	Fri.		Trinity LS Auction House	Trinity	Sat.
	Henderson Comm. Co.	Athens	Thurs.	Tyler	Woodville LS Comm.	Woodville	Tues.
	Valley LS Yard	Mercedes	Mon.				
Hidalgo	Delta Sales Barn	Elsa	Wed.-Fri.	Uvalde	Uvalde LS Sale & Auction	Uvalde	Sat.
	Haggard Sale Yard	Pharr	Thurs.				
	Community Sale Yard	Pharr	Sat.	Van Zandt	Wills Point LS Comm.	Wills Point	Mon.
	Hubbard Auction Co.	Hubbard	Mon.	Victoria	Victoria LS Comm.	Victoria	Wed.
Hill	Sulphur Springs LS Comm.	Sulphur Springs	Mon.	Washington	Brenham LS Auction	Brenham	Mon.
Hopkins	Houston County LS Comm.	Crockett	Mon.	Wharton	El Campo LS Comm.	El Campo	Tues.
Houston	Crockett LS Auction	Crockett	Tues.	Wheeler	Shamrock LS Auction	Shamrock	Fri.
Howard	Big Spring LS Auction	Big Spring	Wed.	Wichita	Wichita LS Auction	Wichita Falls	Wed.
				Wilbarger	Vernon Stockyards Co.	Vernon	Thurs.
Jack	West Texas Comm. Co.	Jacksboro	Thurs.	Williamson	Taylor Comm. Co.	Taylor	Wed.
Jackson	Jackson County LS Exch.	Edna	Sat.	Wilson	Georgetown Comm. Sale	Georgetown	Fri.
Jasper	Jasper LS Commission	Jasper	Wed.	Wise	Floresville LS Comm.	Floresville	Tues.
Jefferson	Coastal Sale Association	Beaumont	Tues.	Wood	Decatur Auction	Decatur	Wed.
Jim Wells	South Texas Auc. & Comm.	Alice	Tues.		Bridgeport Auct. Co.	Bridgeport	Sat.
	Alice LS Comm. Co.	Alice	Fri.	Young	Graham LS Comm.	Graham	Mon.
Johnson	Cleburne LS Comm. Co.	Cleburne	Sat.				
	Bud Burleson Comm. Co.	Cleburne	Fri.				
	Johnson Comm. Co.	Burleson	Wed.				
Jones	Stamford LS Exchange	Stamford	Wed.				
Karnes	Kenedy LS Exchange	Kenedy	Thurs.				
Kerr	Kerr County Comm. Co.	Kerrville	Tues.				
Kimble	Ranchers' Comm. Co.	Junction	Wed.				

¹Information on auction locations and dates was supplied by the Livestock Sanitary Commission of Texas.