INDEPENDENT MEAT PACKING PLANTS IN TEXAS

TEXAS AGRICULTURAL EXPERIMENT STATION
R. D. LEWIS, DIRECTOR, COLLEGE STATION, TEXAS,
IN COOPERATION WITH THE U. S. DEPARTMENT OF AGRICULTURE
SUMMARY

Meat packing in Texas is an important and growing industry. Red meat production in Texas increased almost 44 percent between 1948 and 1956. The 1954 Census of Manufacturing reported that 153 commercial packing plants in Texas had 10,464 employees with an annual payroll of $40,280,000. The value added by processing in these plants was $68,548,000.

This report summarizes information obtained through interviewing 63 independent commercial packing plant owners or operators in 1956 and presents layouts for typical Texas packing plants.

Average monthly volume of slaughter in the 63 plants surveyed ranged from slightly over 500 to more than 18,000 animal units in 1955, averaging 2,857 animal units. Almost every plant slaughtered cattle and calves in commercial volume. Fifty-six percent slaughtered hogs, and 14 percent slaughtered either or both sheep and goats.

Independent packing plants in Texas purchase livestock from a wide variety of sources. These plants reported that in 1955 they purchased 48 percent of their cattle and calves at auction markets, 37 percent at stockyards and 15 percent from farmers and dealers.

The estimated 1955 value of 50 plants averaged more than $300,000, ranging from a low of $40,000 to more than $1,500,000. The reported investment averaged $11.12 per animal unit slaughtered, ranging from $15.33 in the small plants to $7.88 in the large plants.

The average age of the plants surveyed was 16 years, ranging from 2 to more than 40 years.

Based on estimates of capacity and actual volume, the plants slaughtering cattle and calves were operating at an average of 45.3 percent of capacity in 1955. Plants slaughtering hogs were operating at an average of 25.8 percent of estimated capacity. Large plants appeared to be making more efficient use of their facilities and equipment than small and medium-sized plants.

Ninety-seven percent of the independent commercial packing plants surveyed were operating in 1956 under some form of meat inspection, primarily city inspection. Three percent of these plants had no meat inspection.

Half of these plants reported rendering plants. These were relatively more prevalent among the larger plants, where 82 percent had them.

Ninety-four percent of these plants produced and sold fresh carcass meat in 1956. Seventy-eight percent produced and sold some boned meat. Two-thirds were producing sausage or cured products, and 44 percent were selling frozen meat.

Most of these plants were structures which had been enlarged from time to time as the need arose for more space. In most cases, it appeared that no long-range planning had been given to the future alterations of the structures to permit efficient operation. Most packing plant equipment, particularly that used on the killing floor and in rendering plants, appeared to be outmoded.

Most of the plants did not have adequate chill and cooler room space to handle their products efficiently. In many plants, chill and cooler room space was a major factor limiting the expansion of production.

Many holding pen facilities are laid out poorly and located too far from the plants.

A number of common safety hazards were noticed in the plants. Among these were smooth-finished concrete floors on the killing floors, the failure of employees to wear safety equipment and killing floors which were not properly cleaned.

Seasonal variation contributes to plant inefficiency. Most of the plants were built to take care of volumes during the peak of the slaughter season and operate under capacity during the low points of the season.

Handling of materials and supplies is accomplished more efficiently in one-story plant structures or in cases where gravity flow is utilized. Transporting these items up to a second floor invariably creates bottlenecks to operations.
CONTENTS

Summary ............................................. 2
Acknowledgments .................................... 3
Introduction ....................................... 5
Independent Commercial Meat Packing Industry 5
  Location of Packing Plants .......................... 5
  Species Slaughtered ................................ 6
  Volume of Slaughter ................................ 6
  Livestock Sources and Purchasing Methods ......... 6
  Type of Slaughter .................................. 7
Plant Information .................................... 8
  Estimated Plant Value .............................. 8
  Business Organization .............................. 8
  Age of Plants .................................... 8
  Time under Present Management .................. 9
  Volume and Estimated Capacity .................... 9
Meat Inspection .................................... 9
Hide Handling ...................................... 10
Inedible Offal Handling .............................. 10
Meat and Meat Products Produced and Sold ......... 10
Plans for Changing Operations ..................... 11
Packing Plant Facilities ............................ 11
Plants Slaughtering Cattle and Calves ............... 11
  Holding Pens .................................... 12
  Killing Floor Work Areas ......................... 12
  Knocking Pen ..................................... 12
  Dry Landing ...................................... 12
  Bleeding and Heading ............................. 12
Skinning Bed ....................................... 14
Rumping, Backing and Eviscerating .................. 14
Hide Dropping ...................................... 14
Carcass Splitting .................................. 14
Washing and Shrouding .............................. 14
Weighing .......................................... 15
Head Workup ....................................... 15
Pluck Workup ...................................... 15
Chill Room ......................................... 15
Cooler Room ...................................... 16
Boning Room ....................................... 16
Edible Offal Cooler ................................ 16
Loadout Docks ..................................... 17
Hide Room ......................................... 17
Offal Wash Room ................................... 17
Rendering Department ............................... 17
Nonprocessing Rooms ................................. 18
Equipment Wash Rooms ............................... 18
Supply Storage Rooms ............................... 18
Welfare Room ...................................... 18
Boiler Room ....................................... 18
Compressor Room ................................... 18
Offices ........................................... 18
Maintenance Building ................................ 18
Plants Slaughtering Cattle, Calves and Hogs ....... 19
Hog Slaughtering and Dressing Work Areas .......... 19
  Shackling and Hoisting ............................ 20
  Sticking and Bleeding ............................. 20
  Scalding ......................................... 21
  Dehairing ....................................... 21
  Gambrelling ....................................... 21
  Singeing ......................................... 21
Wash ................................................ 21
Eviscerating ....................................... 21
Carcass Splitting .................................. 21
Leaf Fat Pull ....................................... 21
Cleaning .......................................... 21
Weighing, Inspection and Stamping .................. 21
Chill Room ......................................... 22
Cutting Room ....................................... 22
Sausage Kitchens ................................... 22
Curing Room ........................................ 22
Smokehouses ....................................... 22
Shipping Room ..................................... 23
Loadout Docks ..................................... 23
Freezer Room ....................................... 23
Rendering Department ............................... 23
Nonprocessing Rooms ................................. 23

ACKNOWLEDGMENTS

This report is based on cooperative research between the Texas Agricultural Experiment Station and the Transportation and Facilities Branch, Marketing Research Division, Agricultural Marketing Service, U. S. Department of Agriculture.

The authors acknowledge the assistance of the following individuals who have helped make this publication possible: John G. McNeely, professor, Department of Agricultural Economics and Sociology; and George E. Turner, agricultural economist, Agricultural Marketing Service, U. S. Department of Agriculture, for initiating this research and providing valuable guidance and advice; James W. Graves, research assistant, Department of Agricultural Economics and Sociology, for assistance in collecting, assembling and analyzing the data; and Roy W. Snyder, extension meat specialist, Department of Animal Husbandry, for valuable advice and assistance in conducting this research.
Figure 1. Distribution of livestock in Texas, 1954. Each dot equals 10,000 animal units (one animal unit equals one head of cattle, two hogs or 5 sheep.)

Figure 2. Distribution of population in Texas, 1950. Each dot equals 5,000 people.

Figure 3. Location of meat packing plants studied.
INDEPENDENT MEAT PACKING PLANTS IN TEXAS

JARVIS E. MILLER and DONALD R. HAMMONS

The commercial slaughter of livestock in Texas has increased rapidly in recent years. In 1956, there were 1,891,000 cattle, 1,117,000 calves, 1,909,000 hogs and 977,000 sheep and lambs slaughtered in Texas. Red meat production totaled 1,333,199,000 pounds.

For the purposes of this report, a commercial packing plant is defined as an establishment engaged primarily in the slaughtering of cattle, calves, hogs, sheep, lambs and goats and the processing of the meat from these animals for sale. A listing of Texas slaughtering establishments in 1956 showed that more than 900 were engaged in slaughtering livestock. Of these, 406 were classified as individuals and small butchers, 273 were grocery stores and meat markets, 163 were frozen food locker plants, and 82 were commercial packing plants.

This is the first in a series of reports which will be issued as research progresses. It is descriptive in nature and summarizes information concerning Texas independent commercial packing plants such as location, size, species slaughtered and typical layouts.

Future reports will be more analytical and specific and will contain recommendations concerning costs, methods of operation, facilities and equipment and other aspects of packing plant operation and management.

This report is concerned exclusively with the commercial meat packing plant. It is divided into two parts; the first, a general description of the Texas independent commercial meat packing industry, and the second a description of typical plant layouts, methods and facilities. Information was obtained from independently owned and operated packing plants in Texas. No information was obtained from plants owned by the large national packers.

INDEPENDENT COMMERCIAL MEAT PACKING INDUSTRY

Information such as volume and species of livestock slaughtered, operating methods and practices, procurement and distribution was collected in 1956 from 63 independent commercial meat packing plants operating in Texas. The information which follows is based on an analysis of the data obtained from these plants. The volume of these plants in 1955 represented approximately 59 percent of the total cattle and calf slaughter, 38 percent of the hog slaughter and 16 percent of the sheep and lamb slaughter in Texas.

For the purposes of this report, a commercial packing plant was arbitrarily defined as a plant slaughtering more than 500 animal units (1 head of cattle or calves, 2 hogs or 5 sheep or goats) per month. Sixty-three plants were in this category in 1955. Plants were further categorized as small, medium or large. A small plant was defined as one slaughtering 501 to 2,500 animal units per month. There were 40 of these in Texas in 1955. Twelve medium-sized plants were slaughtering 2,501 to 4,500 animal units per month; and 11 large plants slaughtered more than 4,500 animal units per month.

Even within the independent commercial packing plants, there is a considerable amount of economic concentration. In terms of total slaughter, the 11 large plants accounted for 50 percent of the total animal units slaughtered in the 63 plants, the 12 medium-sized plants accounted for 22 percent and the 40 small plants, 28 percent.

Location of Packing Plants

Location is very important in the financial success of a packing plant. In considering location, several factors are important. Among these, probably the two most important are sources of livestock and markets to be served. Both are important in terms of the transportation, purchasing and marketing costs of the livestock and meat.

Livestock generally are distributed well throughout Texas, Figure 1, with the most concentrated in Central Texas. Cattle and calves are scattered throughout the State; sheep and goats are concentrated in West and Southwest Texas; and hogs in Central and East Texas. Livestock may be purchased at the terminal markets at Fort Worth, San Antonio or Houston, at one of the more than 150 livestock auction markets scattered throughout the State or directly from farmers and ranchmen. With the exception of hogs, most Texas packers usually are able to obtain their livestock requirements within the State. Large numbers of hogs are imported into Texas for slaughter.

In Texas, the human population is concentrated in Central and East Texas and along the
Gulf Coast, Figure 2. Population is less dense in the Panhandle, and sparse in much of West Texas.

Considering the livestock and human populations, Texas commercial packing plants appear to be well located, Figure 3. The greatest concentrations of plants are in the Dallas-Fort Worth area, Houston and San Antonio. These are all major population centers and major livestock marketing centers. Plants in these metropolitan areas tend to be larger than plants in smaller cities, although there are many small plants in these areas.

**Volume of Slaughter**

Average monthly volume of slaughter in Texas independent commercial packing plants varies widely from plant to plant. For the 63 plants surveyed in 1956, it ranged from slightly more than 500 to more than 18,000 animal units. The average was 2,857 animal units per month. Large plants slaughtered an average of 8,100 per month; medium-sized plants, 3,338; and small plants, 1,312. Plants which slaughtered cattle and calves had an average monthly volume of 3,052 head. Large plants slaughtered 5,600 head of cattle and calves; medium-sized plants, 2,967; and small plants, 1,040. Plants that slaughtered hogs averaged 2,349 head per month. Large plants averaged 8,250 head of hogs per month; medium-sized plants, 2,025; and small plants, 522. Those which slaughtered sheep or goats or both, slaughtered an average of 1,679 head per month. Large plants slaughtered 4,762 head; medium-sized plants, 2,000; and small plants, 975.

**Species Slaughtered**

Almost every plant surveyed slaughtered cattle and calves in commercial volume in 1955. This was due to the general availability of cattle and calves and to the ready market for beef in Texas.

Slightly more than half of the plants (56 percent) slaughtered hogs in 1955. A higher proportion (more than two-thirds) of the smaller plants slaughtered hogs, while only slightly more than one-third of the medium and large plants did. The major reason that hogs are not slaughtered by more plants is the shortage of hogs in Texas and the need to import them from surplus hog producing areas in the Midwest. A number of plants purchase uncured pork cuts such as bellies, shoulders and hams from plants located in the Midwest.

While Texas is the major sheep and goat raising state in the country, relatively few independent packing plants in the State slaughtered sheep or goats because of the limited market for lamb and mutton in Texas. Therefore, most of the lamb and mutton produced in Texas plants must be shipped out of the State for consumption. This results in both a marketing problem and a need for federal meat inspection. Only 14 percent of the plants surveyed were slaughtering sheep or goats in 1955. More than one-third (36 percent) of the large plants, but less than 10 percent of the small and medium-sized plants, slaughtered sheep or goats. Most of these plants are located in San Antonio and in South Texas, and most of their products are for the Latin-American trade or for the chili and processed meat trade.

Packing plant operators have a considerable choice in the degree to which they specialize in their slaughtering operations. For example, 39 percent slaughtered only one species of livestock in 1955, usually cattle and calves. Specialization was greatest among the medium-sized plants where 67 percent slaughtered only one species. Among the large plants, 36 percent slaughtered only one species. Thirty-two percent of the small plants slaughtered only one species.

More than half (53 percent) of the plants slaughtered two species. Sixty-one percent of the small plants slaughtered two species, compared with 55 percent of the large plants and 25 percent of the medium-sized plants.

Eight percent of the plants slaughtered three species. There was little variation between plants of the different sizes.

**Livestock Sources and Purchasing Methods**

Independent packing plants have a variety of sources from which to purchase livestock within the State. However, with the development of improved transportation facilities, they are no longer restricted to Texas, but may purchase live animals from a considerable distance outside the State. Livestock imported into Texas for slaughter consist primarily of hogs, with some grades of cattle which are not available within the State, especially at some seasons of the year.

The sources from which livestock are purchased depend on the location of the plant, the size of the plant, the species and quality of livestock slaughtered and the availability of livestock. The plants surveyed reported that they purchased an average of 48 percent of their cattle and calves at auction markets, 37 percent at stockyards and 15 percent from farmers, ranchmen and dealers, Figure 4.

Medium-sized plants purchased a higher proportion (53 percent) of their cattle and calves at auction markets, while the large plants appeared to divide their purchases between auction markets and stockyards.

Small plants on the average appeared to divide their purchases between auction markets and stockyards. Those near stockyards purchased a high proportion of their livestock at stockyards, while those away from stockyards were better patrons of auction markets.

Farmers and dealers accounted for almost one-fourth of the cattle slaughtered by medium-
Most livestock were delivered to plants in trucks hired by the plant manager or buyer. A few plants had their own trucks for transporting livestock from the markets.

**Type of Slaughter**

Texas independent meat packers engage primarily in two types of slaughter—commercial slaughter for their own accounts and custom slaughter. In 1955, almost all of the plants contacted reported they slaughtered for their own accounts, and two-thirds did some custom slaughtering. One plant, a municipal abattoir, operated only on a custom basis.

Custom business appears to be related directly to size. More than three-fourths (78 percent) of the small plants did some custom slaughtering. More than half (58 percent) of the medium-sized plants and more than one-third (36 percent) of the large plants did some custom slaughter.

Custom slaughter business is derived from a number of sources. In 1956, farmers and other individuals were the main source of custom business in these plants. Grocery stores and meat markets and meat jobbers accounted for custom purchases.
business in about 25 percent of the plants engaged in custom slaughter.

Charges and arrangements for custom slaughter vary greatly from plant to plant, depending to some extent on the volume of custom business. Many of the larger plants do not want much custom business; consequently, the cost is high. Most charges for slaughtering cattle and calves involve retention of the hide and inedible offal by the plant. Many plants make an additional charge per pound for custom slaughtering. Valuing hides and offal at current market prices and considering additional charges, the average charge to custom slaughter a 750-pound beef animal was $7.50, or about 1 cent per pound live weight. For hogs, the charges were around $2.50 per head.

**PLANT INFORMATION**

**Estimated Plant Value**

The value of packing plants is difficult to determine and depends on factors such as location, size, date built, type of construction and type and amount of processing. Plant owners or managers were asked for their estimates of the present values of their plants. Estimates were obtained for 50 plants. These 50 Texas plant owners or operators estimated in 1955 that their plants were worth almost $16,000,000, or an average of more than $300,000 per plant. The range was $40,000 to more than $1,500,000.

Small plants averaged an estimated $250,000; medium-sized plants, $460,000; and large plants, $600,000.

These 50 plants in 1955 slaughtered almost 1,500,000 animal units of livestock. The average reported investment per animal unit slaughtered was $11.12. Reported investment per animal unit of livestock slaughtered in 1955 averaged $15.33 in the small plants, $12.63 in the medium-sized plants and $7.88 in the large plants. These figures are significant for plant managers because the interest on this investment represents a cost of operation. On the average investment of $11.12 per animal unit slaughtered, an interest rate of 6 percent means an interest cost per animal unit of 67 cents. Small plants with an investment of $15.33 had an interest cost of 92 cents per head, compared with 76 cents in the medium-sized plants and 47 cents in the large plants.

Small plants reported considerably greater excess capacities than large plants. The average investment per animal unit of estimated annual capacity was $3.45. There was little variation in investment per unit of capacity among the three sizes of plants. For the small plants, the average was $3.49, compared with $3.82 in the medium-sized plants and $3.30 in the large plants. Interest cost per unit of capacity would av-

<table>
<thead>
<tr>
<th>Size of plant</th>
<th>Corporation</th>
<th>Partnership</th>
<th>Private</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>49</td>
<td>27</td>
<td>24</td>
<td>0</td>
</tr>
<tr>
<td>Medium</td>
<td>50</td>
<td>42</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Large</td>
<td>84</td>
<td>9</td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td>All plants</td>
<td>52</td>
<td>25</td>
<td>20</td>
<td>2</td>
</tr>
</tbody>
</table>

**Business Organization**

Packing plant owners, as do other businessmen, have a choice of several types of business organization. They may incorporate, they may operate as partnerships or as private individuals. A municipally owned plant also is operating in Texas. Slightly more than half were operating as corporations in 1955, Table 1; 26 percent were operating as partnerships; 20 percent were privately owned and operated; and 2 percent were operating under some other form of organization.

A relatively higher proportion of the large plants were incorporated, 64 percent, compared with around 50 percent for the small and medium-sized plants. Partnerships were relatively more prevalent among the medium-sized plants, while privately owned and operated plants were more prevalent in the smaller category.

**Age of Plants**

Texas packing plant buildings are rather new. The average age of the plants included in this survey was 16 years, Table 2. Ages of plants ranged from 2 to more than 40 years. Thirty-nine percent of these plants were constructed after World War II, 20 percent during World War II and 41 percent before World War II.

The volume of business of Texas plants has increased with age. In 1955, large plants averaged 24 years of age, compared with 19 years for medium-sized plants and 13 years for small plants.

<table>
<thead>
<tr>
<th>Size of plant</th>
<th>Small</th>
<th>Medium</th>
<th>Large</th>
<th>All plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-9.9</td>
<td>45</td>
<td>33</td>
<td>19</td>
<td>39</td>
</tr>
<tr>
<td>10-14.9</td>
<td>25</td>
<td>17</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>Over 15</td>
<td>30</td>
<td>50</td>
<td>81</td>
<td>41</td>
</tr>
<tr>
<td>Average age</td>
<td>13</td>
<td>19</td>
<td>24</td>
<td>16</td>
</tr>
</tbody>
</table>
The type of organization also varied with age. Privately owned and operated plants were the oldest on the average, 19 years, compared with 16 years for corporately owned plants and 14 years for plants owned by partnerships.

**Time under Present Management**

The plants included in this survey had been under present management an average of 14.5 years, slightly less than the average age of these plants, indicating a considerable degree of stability in management. Small plants had been under present management an average of 12 years, compared with an average plant age of 13 years. Medium-sized plants had been under present management an average of 16 years, compared with an average age of 19 years. Large plants had been under present management an average of 22 years, compared with an average age of 24 years.

Slightly more than one-third of the plants had come under present management since World War II, Table 3. About one-fourth came under present management during World War II and 41 percent had been under present management before World War II.

Privately owned and operated plants had been under present management an average of 20 years. Corporately owned plants had been under the same management for an average of 15 years, while partnership plants had been under present management an average of 12 years.

**Volume and Estimated Capacity**

Packing plant owners and operators were asked for their estimates of the daily capacities of their plants. In 1955, the plants that were slaughtering cattle and calves were operating at an average of 45 percent of their managers' estimates of capacity, Figure 6. This figure indicates that more than half of the total capacity to slaughter cattle and calves in these plants was not being used. Large plants were achieving higher utilization (64.5 percent of estimated capacity) than medium-sized plants (54.9 percent of estimated capacity) and small plants (28.4 percent of estimated capacity).

The plants that slaughtered hogs operated at an average of only 25.8 percent of estimated capacity. As with cattle and calves, utilization also increased with size of plant, from 17.1 percent of estimated capacity in small plants to 35.3 percent of estimated capacity in larger plants.

There are several reasons for the prevalence of such excess capacities. Probably the major reason is that certain basic facilities and equipment are needed for even a minimum volume of slaughter. Thus, more labor can be used in the slaughtering process to increase volume with existing facilities and equipment. In addition, many plants appear to have been constructed to handle seasonal volumes which are considerably greater than average monthly volume. The local availability of livestock and the markets for meat also are factors, especially for hogs and pork in Texas.

**Meat Inspection**

One function of government is to protect the interest of consumers. Governmental bodies over the years have required the inspection of meat to protect the public from meat derived from diseased animals and from meat slaughtered and processed under unsanitary conditions. Three general types of meat inspection prevail in Texas—federal, state and municipal.

Federal meat inspection is carried out by the Meat Inspection Division of the Agricultural Research Service of the U. S. Department of Agriculture. It is mandatory for meat which moves into interstate commerce. Federal meat inspection service is provided free to plants which request and qualify for it, with the exception that plants are required to pay for any overtime work incurred. To qualify for federal inspection, a plant's facilities must meet certain required specifications.

Federal meat inspection involves both ante-mortem inspection of the live animals and post-mortem inspection of the carcasses and internal organs to detect diseased animals, or animals unfit for human consumption. Slaughtering and processing operations are supervised to insure that they are conducted under sanitary conditions.
State meat inspection in Texas is performed by personnel of the State Health Department. Federal requirements were used as a basis for the present Texas inspection system. Although the actual inspection of animals and meat under state inspection is similar to that of the federal system, there are several differences in the way it is conducted. Building requirements appear to be less rigid than federal. State inspection is voluntary, and state-inspected plants are required to bear the cost of the inspection service. State-inspected meat can move freely within the State.

Most Texas cities with any appreciable volume of slaughter or meat processing maintain municipal meat inspection services. These services usually are provided by employees of the city health department. A number of cities require that any meat offered for sale within the city be inspected, by federal, state or their own inspection services. Municipal inspection requirements vary greatly from city to city. Some appear to be as strict as federal inspection; others appear to be quite lax. Some cities require both ante-mortem and post-mortem inspections of the animal and the carcass; others, only one inspection. Half of the plants under municipal inspection are assessed a charge for the inspection service; in the others, it is provided at no cost to the plants involved.

Ninety-seven percent of the Texas independent commercial packing plants surveyed in 1956 were operating under some form of meat inspection, Table 4. Seventy percent were operating under city inspection, 24 percent under federal inspection and 3 percent under state inspection.

Federal inspection was relatively more prevalent in the larger plants which distribute meat in interstate commerce. City inspection was most prevalent in small and medium-sized plants. Location within the State is important. A small plant located near the border would find its market severely curtailed if it could not obtain federal inspection, while a similar sized plant remote from the border would not have to worry about federal inspection.

**Hide Handling**

Texas commercial packing plant operators may sell hides green, or they may salt and cure them before sale. In many cases, the decision is made on the basis of relative prices of green and salted hides. Some plants do not maintain hide cellars but sell hides green.

**TABLE 4. TYPE OF MEAT INSPECTION BY SIZE OF PLANT. 1956**

<table>
<thead>
<tr>
<th>Size</th>
<th>Federal</th>
<th>City</th>
<th>State</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>10</td>
<td>80</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Medium</td>
<td>25</td>
<td>75</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Large</td>
<td>78</td>
<td>22</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>All plants</td>
<td>24</td>
<td>70</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

Seventy-two percent of the plants reported in 1956 that they salted and cured their hides, and 28 percent sold them green, Table 5. The proportion of plants salting and curing their hides was relatively higher in the small and medium-sized plants, while the proportion selling hides green was relatively higher in the large plants.

Plants which salted and cured hides reported curing them an average of 36 days. Small plants cured their hides an average of 41, medium-sized plants 24 days and large plants 27 days.

**Inedible Offal Handling**

Inedible offal may be rendered, sold fresh at the plant, cooked and fed to livestock, or simply destroyed. To render offal, a plant must have a rendering plant. Half of the plants studied in 1956 reported rendering plants. Rendering plants tended to be more prevalent among the medium and large plants, where more than 80 percent of the plants reported them. Only 30 percent of the small plants had them.

Forty-six percent of the plants in 1956 were rendering their inedible offal, Table 6. An additional 47 percent were selling their inedible offal at the plant. Six percent were disposing of their offal in some other manner. Among the small plants, 30 percent were rendering their inedible offal, 60 percent sold it at the plant and 10 percent disposed of it in some other manner. Sixty-seven percent of the medium-sized plants rendered their offal and one-third sold it at the plant. Eighty-two percent of the large plants rendered their offal, and 18 percent sold it at the plant.

**Meat and Meat Products Produced and Sold**

Texas packing plants produce and sell a variety of products. Some plants tend to special-
TABLE 7. TYPES OF MEAT PRODUCTS PRODUCED AND SOLD, BY SIZE OF PLANT, 1956

<table>
<thead>
<tr>
<th>Size of plant</th>
<th>Percentage of plants producing and selling</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fresh meat</td>
<td>Boned meat</td>
</tr>
<tr>
<td>Small</td>
<td>92</td>
<td>77</td>
</tr>
<tr>
<td>Medium</td>
<td>92</td>
<td>75</td>
</tr>
<tr>
<td>Large</td>
<td>100</td>
<td>82</td>
</tr>
<tr>
<td>All plants</td>
<td>94</td>
<td>78</td>
</tr>
</tbody>
</table>

size in carcass meat; others produce boned meat, sausage and cured products.

Carcass meat usually is sold in the fresh meat trade. Boned meat is sold for further processing before sale to the final consumer. Much of this meat is sold to sausage makers. Meat may be frozen for storage, shipping or for sale to the final consumer in frozen form. Both carcass and boned meat may be frozen as the occasion arises.

Decisions concerning the types of products to be produced and sold by a given plant depend on the preferences of local consumers, the types and quality of livestock available, relative prices of the different products and personal preferences of the owner. Ninety-four percent of these plants were producing and selling fresh meat in 1956, Table 7. Seventy-eight percent were producing and selling boned meat, and 44 percent were selling some frozen meat. Sixty-seven percent were producing sausage, while 59 percent were producing cured pork products.

Generally, small plants tended to be more diversified than large plants. A higher proportion of the small plants were producing and selling sausage and cured pork products, while large plants tended to specialize in fresh products. Frozen meat was produced by a higher proportion of the medium and large-size plants.

Plants Slaughtering Cattle and Calves

Most of the plants slaughtering cattle and calves in Texas are one-story buildings, with a number of pens attached for holding cattle and calves pending their slaughter, Figure 7. Some of the buildings have partial basements and a few have an office at a second story level. Most of the structures contain 3,000 to 16,000 square feet of floor space. Brick, frame and various types of concrete block structures are common in the packing plant industry of Texas. Concrete blocks are used most often.

The component parts of the facilities of packing plants that slaughter only cattle and calves are holding pens, killing floors, chill rooms, cooler rooms, loadout docks, supply storage rooms, equipment washrooms, welfare rooms, boiler rooms, compressor rooms, maintenance rooms and offices. These facilities are the basic ones needed for slaughtering cattle and calves, and plants using only these facilities generally process carcass meat and edible products. In some instances, plants process inedible products or spe-
cialize in processing specific edible products, or do both. In these cases, one or more of the following are used with the basic facilities: hide room, rendering plant, offal washroom, edible offal cooler and boning or cutting room. The arrangement of the component facilities used by a plant slaughtering cattle and calves is shown in Figure 8. The following description of cattle and calf processing facilities encompasses conditions found in most of the packing plants studied. The sizes of the various areas described include working space for employees.

HOLDING PENS

The holding pens are located in an area adjacent to the plant building. Generally, pens are 6 feet in height and range in size from about 10 by 10 feet to 15 by 30 feet. The number of pens varies widely from plant to plant. The capacity of the pens usually is adequate to hold the number of animals slaughtered by the plant in 1 or 2 days. Concrete floors are used widely for pens, but in some instances only dirt flooring is used. Some holding pens have roofs. A concrete or brick ramp for unloading cattle and calves is included with the holding pen facilities. Alleys, which range from 6 to 10 feet wide, may separate the pens and are used as passageways for driving animals to the livestock chute. Livestock chutes are used as temporary holding areas for animals being driven into the knocking pen. They are about 3 feet wide and range in length from 8 to 40 feet. Some chutes are curved. The arrangement of the holding pens, unloading ramps and livestock chutes for a typical plant slaughtering cattle and calves is shown in Figure 8.

KILLING FLOOR WORK AREAS

The killing floors are rectangular-shaped rooms ranging in size from about 18 by 34 feet for plants killing a small volume, to 45 by 70 feet for plants killing a relatively large volume. Each packing plant has only one killing floor. The floors of most killing rooms are rough-finished concrete equipped with a floor drain for about every 250 square feet of floor space. Ceiling heights of killing floors usually are greater than the rest of the plant, and generally range from 13 to 22 feet. Walls may be partially tiled, plastered or of painted cinderblock finish. Ceilings usually are unfinished or painted. All dressing operations are performed on the killing floor, with each in a specific area of the room. In plants which slaughter a small volume of animals, several of these working areas may be combined within one space. The arrangement of the working areas on a killing floor varies from plant to plant.

Cattle are moved from one area to another on an overhead rail of the manual conveyor type. Carcasses are suspended by hooks attached to trolleys and are pushed manually by the operator to various areas in the plant. Two overhead rail systems common in packing plant killing floors in Texas are the monorail and split-rail types. The difference in these two systems, as they affect the work areas, is that only one carcass splitting area (regardless of the number of skinning beds) is necessary with the monorail system, whereas the split-rail system usually requires the same number of carcass splitting areas as there are skinning bed areas. A certain amount of rail space is used for holding carcasses between most of the working areas. This distance varies between work areas and with the slaughter capacity of the killing floor.

The various areas or parts of the killing floor where specific operations are performed are: stunning except crippled animals which are loaded directly onto the killing floor for stunning. Knocking pens in Texas packing plants sometimes are located outside the plant proper, but usually they are located on the killing floor. A typical knocking pen is about 8 feet wide, 8 feet long and 6 feet high. It has the capacity to hold one large animal or two to four calves. The floor of the knocking pen is usually about 12 or 14 inches above the level of the killing floor. Along one side of the length of the knocking pen, a platform about 5 feet high and 3 feet wide provides working space for the immobilizer. The opposite side of the pen may be a revolving door suspended through the center on a central axle and locked by an overhead latch. The revolving door allows the animal to be moved through the lower half of the pen onto the dry landing area on the killing floor. Another common arrangement is a sliding-type door which is raised by a hoist or counterbalance. Reinforced concrete, pipe and wood are common materials used for constructing knocking pens.

Knocking pen. The knocking pen is used for holding animals while they are being stunned. All cattle and calves are driven into a pen for stunning except crippled animals which are loaded directly onto the killing floor for stunning. Knocking pens in Texas packing plants sometimes are located outside the plant proper, but usually they are located on the killing floor. A typical knocking pen is about 8 feet wide, 8 feet long and 6 feet high. It has the capacity to hold one large animal or two to four calves. The floor of the knocking pen is usually about 12 or 14 inches above the level of the killing floor. Along one side of the length of the knocking pen, a platform about 5 feet high and 3 feet wide provides working space for the immobilizer. The opposite side of the pen may be a revolving door suspended through the center on a central axle and locked by an overhead latch. The revolving door allows the animal to be moved through the lower half of the pen onto the dry landing area on the killing floor. Another common arrangement is a sliding-type door which is raised by a hoist or counterbalance. Reinforced concrete, pipe and wood are common materials used for constructing knocking pens.

Dry landing. Dry landing areas are located adjacent to the knocking pens and range in size from 6 by 8 to 6 by 12 feet. The area is bordered by a raised concrete curb 4 to 8 inches high. The dry landing area is used for holding cattle or calves after they are stunned and moved from the knocking pen. Animals also are shackled and hoisted to an overhead rail for movement to the bleeding area. Figure 9. The overhead rail usually is about 16 feet above the floor. Each killing floor layout provides space for one dry landing area.

Bleeding and heading. The bleeding and heading area is adjacent to the dry landing area. It ranges in size from about 6 by 10 feet to 12 by 25 feet and is bordered by a raised concrete curb.
Figure 8. A layout of a two-bed plant for slaughtering cattle and calves.
4 to 8 inches in height. Most bleeding and heading areas are equipped with a combination blood and water drain. Cattle are stuck and bled and the heads and forelegs skinned and removed in the bleeding area. Two to 20 animals may be held in this area at one time, the number depending upon the rate of slaughter. Only one bleeding area is located on a killing floor.

**Skinning bed.** The hind legs are removed from the animals and their bellies and sides are skinned in the skinning bed area, Figure 10. Because of inspection requirements, a few plants also remove the forelegs in this area. Plants which slaughtered a very small volume usually had only one skinning bed, while plants with a larger volume had two or three skinning beds.

Each skinning bed comprises an area of about 8 by 10 feet. Plants with two or three beds have a skinning bed area two or three times larger. In some plants, two steel pritch plates 2 by 3 feet in size, installed 2 feet apart, are fastened to the floor of the skinning bed. These plates are used as stays for a pritch which holds a carcass on its back for skinning. In other plants, a 2 by 8 foot skinning cradle is fastened to the floor to hold the carcass. Skinning beds in Texas plants are 4 to 8 feet from the curb of the bleeding area.

**Rumping, backing and eviscerating.** The rumping, backing and eviscerating area ranges from 4 by 8 feet to 5 by 10 feet and is used for skinning the rump and back of a carcass, Figure 11, and removing the viscera. The number of rumping, backing and eviscerating areas in a plant is the same as the number of skinning beds. Plants killing a relatively large volume may have two or three such areas. When a plant has one rumping, backing and eviscerating area, it is located 14 to 16 feet from the skinning bed. If two areas are used, they are located about 16 feet from the skinning beds; a plant with three areas uses a distance of 16 to 18 feet from the skinning beds. A few plants separated the two areas with only a few feet. These operations usually are performed before the carcass is landed on the dressing rails.

**Hide dropping.** The hide-dropping area is about 4 by 5 feet in size and is separated from the eviscerating area by 2 to 15 feet. Some plants killing a small volume did not utilize a separate area for dropping hides from carcasses. The number of hide-dropping areas in a plant is usually the same as the number of skinning beds. The area is used for skinning the hide from the neck of the carcass. Only one carcass at a time is processed in each hide-dropping area.

**Carcass splitting.** The carcass-splitting area is about 4 by 6 feet in size and is located 2 to 16 feet along the overhead rail layout from the hide-dropping area or from the rumping, backing and eviscerating area (if the plant does not have a hide-dropping area). Only one carcass-splitting area is used in plants which use the monorail system. The split-rail system uses the same number of carcass-splitting areas as skinning-bed areas. Space is provided for a portable carcass splitter's stand and saw, Figure 12.

**Washing and shrouding.** Washing and shrouding areas range in size from 4 by 4 feet to 6 by 12 feet. They provide space for holding one to six sides and a washing and shrouding platform, Figure 13. In a few plants which slaughtered a comparatively large volume, this area was divided into two separate work areas with space.
for a platform in each area. Five to 20 feet of overhead rail may separate the carcass-splitting area and washing and shrouding area. In this area, each side of the carcass is washed and usually shrouded with muslin cloth. In some plants, where weighing is performed before the carcass is washed and shrouded, the weighing area follows the carcass-splitting area.

Weighing. The weighing area which is about 4 feet square is separated from the wash and shroud area by 5 to 10 feet of overhead rail. The weighing area provides space for overhead track scales and working space for the weigher. Only one carcass (two sides) is weighed at a time. In most cases, an overhead rail 8 to 20 feet long leads into the chill room from the weighing area. This length of rail may accommodate 6 to 15 average-sized carcasses after they have been weighed, Figure 14.

Head workup. The head-workup areas in packing plants range from 8 feet square to 10 by 30 feet. This area provides space for a head-flush cabinet, a head-workup table, several storage containers, one or two head-inspection racks and a sterilizing lavatory. Space for working heads often is adjacent to the bleeding pit or skinning-bed area. Generally, the heads are dehorned and flushed, tongues are removed and cheekmeat and headmeat are trimmed in this area. Each killing floor provides space for one head-workup area.

Pluck workup. Pluck-workup areas range from 4 by 6 feet to 8 by 10 feet and usually are located on the killing floor. In some cases, an inspection table (approximately 3 by 6 feet in size) is provided. This area generally is used for separating the edible glands.

CHILL ROOM

The chill room is used for lowering the temperature of “hot” carcasses after they have been weighed. In the plants which shrouded the carcasses, the shroud was removed from the carcass in the chill room and frequently the sides were stamped and graded. In most plants, carcasses remain in the chill room 12 to 24 hours. The rooms usually are rectangular shaped and composed of concrete floors and plastered walls and ceilings. Chill rooms are insulated and vary widely in size, ranging from about 15 by 25 feet to 30 by 60 feet. Ceilings are 13 to 15 feet high. Generally, this room has a carcass-holding capacity of one-half to nearly the same as the cooler room.

Chill rooms are equipped with overhead rails 9½ to 11 feet high. The rails usually are spaced on 2½-foot centers and the outside rails are 2 to 4 feet from the walls. The chill room also provides space for one of three types of refrigerating systems: the brine spray system, the overhead blower-type unit or the floor-type space unit. Usually, only one chill room is located in a plant; however, large volume plants sometimes utilize two rooms. Edible offal is sometimes stored in this room for chilling.

Figure 11. Back skinning showing carcass positioned on overhead monorail.

Figure 12. Carcass splitting performed with monorail system of overhead rails.
COOLER ROOM

The cooler room is used for storing carcasses until shipment is made, Figure 15. Most plants grade and stamp carcasses here. Many plants, particularly ones which kill a small volume, utilize a small portion of the cooler room for boning or making retail cuts. Large volume plants use the cooler room mainly for storing carcasses. The rooms vary widely in size, ranging from 15 by 30 feet to 30 by 70 feet. The combined capacity of the chill and cooler rooms averages a little more than twice the killing capacity of the plant. Floors of the rooms are concrete and the ceiling and walls finished with cement plaster. Ceiling heights range from 13 to 15 feet. The cooler room is insulated and equipped with overhead rails 9½ to 11 feet above the floor. Overhead rails are spaced on 2 or 3-foot centers and the outside rails are installed 2 to 4 feet from the wall. One of the outer rails is used as a working rail and a few of the larger plants provide a working rail between each pair of storage rails.

BONING ROOM

The boning room is used for cutting sides into quarters, cutting quarters and removing bones from the meat. A small volume of cuts may be prepared for the retail trade and these are wrapped in the boning room.

Plants boning a small volume of meat usually perform the boning operations in the cooler room. Plants boning a large volume of meat may use a separate room for this purpose. The volume of meat boned determines the size of the boning room. Boning rooms in these Texas packing plants are insulated, generally range in size from 20 by 20 feet to 40 by 40 feet and are near the cooler. Space may be provided in the boning room for two or three work tables from 3½ by 6 feet to 3½ by 10 feet, a floor-type band saw, a meat grinder, sterilizing laboratory and refrigerating units. Working space also is provided for boners and a storage area for one or more 55-gallon drums or tub trucks used for holding boned meat and moving it from the boning room. The boning room is equipped with overhead rails that lead from the cooler. Some boning rooms provide space for the backlog storage of several sides of carcasses. Most boning rooms have concrete floors, and walls and ceilings usually are finished with cement plaster. Occasionally, the walls are tiled to a height of 6 feet or more.

EDIBLE OFFAL COOLER

Many of the plants slaughtering a relatively large number of cattle and calves have an edible offal cooler to chill and hold hearts, livers and tongues. These insulated rooms also may be used to hold sweetbreads, brains, heads or other specialty items. Plants which slaughter a small volume of animals may store these products in the chill room. Edible offal coolers range in size from approximately 12 by 15 feet to 20 feet square, with ceiling heights 8 to 15 feet. Generally, the edible offal cooler adjoins the chill or cooler room. Floors of the edible offal room are made of concrete, and walls and ceilings usually
are plastered. Space is provided for approximately two to eight stationary or portable racks ranging in size from 3 by 4 by 5 feet to 4 by 12 by 5 feet and for the movement of products into and through the room.

LOADOUT DOCKS

The loadout dock is used for transferring cattle and calf carcasses and edible byproducts from the plant proper into trucks. The dock also provides working space for weighing, stamping and quartering carcasses. They are usually rectangular in shape and range from 8 to 10 feet wide and 30 to 60 feet long. They are either elevated to a height of about 50 inches or at ground level. Loadout docks are either enclosed or open. The enclosed type is walled on all four sides and the side from which meat is loaded out usually has two to seven doors, Figure 16. Doors are hinged or sliding. The enclosed-type dock may or may not be refrigerated. Usually, refrigerated loadout docks are insulated, although some enclosed refrigerated docks are insulated only partially.

The loadout dock has an overhead manual conveyor type rail for transporting carcasses and an overhead track-weighing scale. It is adjacent to the cooler, with the dock rails being the same height as those in the cooler. Frequently, the overhead rail is dropped in height at loading points to permit easy movement of carcass forequarters into trucks. A small number of plants own trucks in which overhead rails have been installed. A loadout rail was installed in these trucks on the same level as the truck rails would be when the truck is backed up to the dock for loading. A short section of rail was then bolted in place to connect the two rail systems and permit carcass sides to be rolled from the dock onto the truck.

HIDE ROOM

The hide room is used for storing and curing hides, Figure 17. Plants slaughtering cattle and calves do not always have a hide room. Whether a plant has a hide room usually depends on how much more revenue may be obtained from cured hides rather than green hides. Some plants with hide rooms use them only periodically, depending on the price ratio of green to cured hides.

Hide rooms range from about 10 by 20 to 30 by 60 feet in size. A room may contain one to three concrete vats, each 15 to 20 feet square. Each vat has a drain. Generally, space is provided in the hide room for storing salt, and weighing and bundling hides for shipment. A hide room may be in a basement, in a separate building or on the same floor of the plant proper in an adjoining room. Those located in separate buildings usually are of frame construction; when they are located in the basement or in an adjacent room of the plant, they usually are of the same construction as the plant proper.

Figure 15. Cattle and calf carcass cooler.

OFFAL WASH ROOM

The offal wash room is used for separating viscera and emptying and washing paunches. In plants which do not have an equipment wash room, part of this room sometimes is used for washing and sterilizing equipment. These rooms usually adjoin the killing floor and vary from 15 feet square to 20 by 40 feet. The floor is made of concrete and the walls and ceiling are finished with plaster or painted. Some of the walls are finished with tile. The offal washroom usually provides space for a paunch lift, separating table, hopper and washer and a sterilizing lavatory.

RENDERING DEPARTMENT

The rendering department is used for converting inedible products such as legs, heads, bones and inedible offal into tankage. Some plants also cook blood to convert it into a powdered form. The rendering department usually is of frame or corrugated iron construction. Two floor levels are used, permitting materials to be fed into the cookers from the top. Rendering departments vary in size from 20 by 25 feet to 30 by 45 feet and often are not located on the
plant premises. Usually, 1,000 to 2,000 square feet of floor space provides space for a preparation area, two cookers, a hydraulic press and a storage area for tankage.

**NONPROCESSING ROOMS**

Nonprocessing rooms consist of equipment washrooms, supply storage rooms, welfare rooms, boiler rooms, compressor rooms, maintenance rooms and offices. Not all plants have rooms which are used exclusively for each purpose as named; however, some space in the plant is allotted as necessary.

**EQUIPMENT WASH ROOMS**

Equipment wash rooms are used primarily for washing, rinsing and sterilizing plant equipment. Rooms range in size from 8 by 10 feet to 10 by 20 feet. Floors, walls and ceiling usually are finished similar to the processing rooms; occasionally, walls may be tiled. Some plants have two equipment wash rooms; one room is used to wash, rinse, sterilize and oil trolleys, and the other is for washing other plant handling equipment. Plants without a separate equipment wash room, wash their equipment on the killing floor or in some other area of the plant.

**SUPPLY STORAGE ROOMS**

Supply storage rooms are used mainly for storing cardboard cartons. Excess plant equipment and block salt sometimes are stored in the supply storage room. Supply storage rooms range in size from 5 by 10 feet to 15 by 30 feet. The floors are concrete, with walls and ceiling unfinished or painted. Most plants have only one storage room, but plants with two or three storage rooms are common.

**WELLFARE ROOM**

A welfare room provides space for lavatory facilities, employee lockers and toilets for packing plant employees. Not all packing plants have welfare rooms and in such cases, only lavatory and toilet facilities are provided. Most welfare rooms are a part of the plant proper. The rooms are 15 by 30 feet to 20 by 40 feet in size.

**BOILER ROOM**

Hot water and steam are mandatory for packing plants; consequently, boiler space is necessary in all plants. However, boiler rooms in Texas packing plants range from fairly large substantial structures located adjacent to the plant proper, to small areas located in nonprocessing departments. Boiler rooms are from 4 feet square to 15 by 20 feet in size. Walls and ceilings are usually unfinished and concrete floors are common.

**COMPRESSOR ROOM**

The compressor room is used for housing pumping units and condensers which provide plant refrigeration. There may be two to ten compressor units located in the rooms, which range in size from 9 by 15 to 10 by 50 feet. Frequently, space is provided in the compressor room for a maintenance area. The room is nearly always adjacent to the plant proper. Cooling towers, which are a part of the refrigeration system, usually are constructed on the roof over or near the compressor rooms. One or more of these compressor rooms may be located in a plant. Construction is similar to that of boiler rooms.

**OFFICES**

Offices are divided into three types: general, management and inspector's. The general offices in plants range from 9 by 12 to 20 by 50 feet. Space is provided for clerical workers, salesmen and buyers, and it may be partitioned into two or more offices. Management offices are 10 by 10 feet to 15 by 15 feet in size and provide space for the manager, or the manager and assistant manager. In smaller packing plants, the management office often is located within the general office. The inspector's office usually is about 8 feet wide and 10 feet long. Some plants do not provide offices for inspectors.
MAINTENANCE BUILDING

Many plants have maintenance buildings separate from the plant proper. In some plants, a part of a room, such as the compressor room houses tools and provides space for maintenance work. Maintenance buildings range from 10 by 15 feet to 15 by 30 feet in size and usually are of corrugated iron or frame construction.

Plants Slaughtering Cattle, Calves and Hogs

Packing plants slaughtering cattle, calves and hogs in Texas vary from one-story buildings with a few thousand square feet of floor space to multi-story structures containing 30,000 or more square feet. Materials used in construction of these buildings are the same as those used for packing plants slaughtering only cattle and calves.

In this type of plant, cattle, calves and hogs are slaughtered and processed in the same building. Hogs are slaughtered once or twice a week, during which time cattle and calves are not slaughtered.

Facilities and the component parts of the facilities used to process cattle and calves in this type of plant are the same as described previously. In addition to these facilities, the component parts of the facilities of most packing plants slaughtering cattle, calves and hogs are the hog slaughtering and dressing department, chill room, cutting room, sausage kitchen, curing room, smoke room and shipping room. Some packing plants which process small volumes of pork products may have separate rooms for bacon slicing, bacon chilling, ham pumping, sausage packaging, cured products, lard rendering and storage, Figures 18, 19 and 20. The size of these rooms varies widely, depending on the volume of products handled. Usually these work areas are combined in one or more of the basic facilities. A layout of one plant slaughtering cattle, calves and hogs is shown in Figure 21.

Hogs are held in the same holding pen area used for cattle and calves and the same or a similar chute is used for driving hogs to the slaughtering and dressing departments.

This type of plant processes some inedible products. Facilities used for this purpose are the same as those described in the section on cattle and calf slaughter.

HOG SLAUGHTERING AND DRESSING WORK AREAS

The hog slaughtering and dressing department is located in the killing room used for slaughtering cattle and calves. The mechanical line, which composes the first five areas of work, may or may not be separated by a partition from the cattle and calf-killing floor. A powered hoisting device, short gravity rail, scalding tank, dehairing machine and metal gambrelling table are used in the mechanical line. When partitioned, this area usually provides sufficient additional space to accommodate other areas of work for hog dressing. In many plants, however, this department is not partitioned from the rest of the killing floor, and the remaining seven major hog-dressing operations are performed in the cattle and calf-killing area by utilizing portions of the same overhead rails.

The average hog slaughtering and dressing department is divided into 12 major work areas. Establishments which slaughter small volumes of hogs may combine some of the work areas, while others may perform the work in a different manner and rearrange the sequence of work areas or equipment and work methods.

The 12 major work areas are: shackling and hoisting, sticking and bleeding, scalding, dehairing, gambrelling, singeing, washing, eviscerating, Figure 19. Sausage slicing and packaging area.

Figure 20. Cured item storage area. These pork products have been cured and smoked and are now awaiting further processing.
carcass splitting, leaf fat pulling, cleaning, weighing and stamping. Only one of each of these areas was used in hog slaughtering and dressing departments in most Texas slaughter plants studied.

The space which is utilized for most hog slaughtering and dressing departments may vary from approximately 15 by 30 feet to 25 by 60 feet. Since this area is located on the cattle and calf-killing floor, materials used for construction are the same.

**Shackling and hoisting.** The shackling and hoisting area is used for shackling and hoisting hogs to a level with an overhead bleeding rail. The area is about 3 by 6 feet in size and usually is located at the end of the chute through which hogs are driven into the slaughtering department. Space is provided for an automatic hoist and working room for the shackler.

**Sticking and bleeding.** This area, used for sticking and bleeding hogs, varies from 4 by 6 feet to 5 by 15 feet in size, and will hold 2 to 10 animals. It is adjacent to the shackling and hoisting area. Space is provided for a sticker's platform, bleeding pit with a blood splash guard and a short overhead gravity bleeding rail. A

---

**LEGEND**

**HOG WORK AREAS**
1. SHACKLING & HOISTING
2. STICKING & BLEEDING
3. SCALDING
4. DEHAIRING
5. GAMBERLING
6. SCRAPE & WASH
7. Eviscerating & Splitting
8. Pull Leaf Lard
9. Clean & Inspect
10. Weighing

**CATTLE & CALF WORK AREAS**
10. Weighing & Inspecting
11. Knocking Pen
12. Dry Land
13. Sticking & Bleeding
14. Skinning Beds
15. Rumping & Backing
16. Eviscerating, Splitting, Hide Drop
17. Wash
18. Shroud
19. Head Work-Up
20. Inspection

---

Figure 21. A layout of a plant for processing cattle, calves and hogs.
blood drain also is provided in the bleeding pit. Some bleeding areas are constructed of concrete and are an integral part of the slaughtering and dressing area. Generally however, the equipment is not stationary and is constructed of galvanized iron or similar materials.

Scalding. The scalding area is used for unshackling and dropping hogs from the overhead bleeding rail into a scalding vat. It ranges in size from approximately 3 by 8 feet to 8 by 15 feet. Space was provided for a scalding vat and an elevated walkway attached to one side of the vat. The scalding area is adjacent to the sticking and bleeding area. A pivoted-steel cradle is part of the scalding vat and is used to lift hog carcasses from the vat to the next working area. One to eight carcasses are scalded at one time.

Dehairing. The dehairing area ranges from about 3 by 5 to 5 by 15 feet in size and is used to remove most of the hair from the animals. Only one animal is processed at a time. This area is located next to the scalding area and provides space for a mechanical dehairing machine. A steel-pivoted cradle also is used with this machine for lifting the carcass from the dehairing machine onto the gambrelling table.

Gambrelling. The gambrelling area varies in size from 4 by 5 to 8 by 10 feet, with space provided for a gambrelling table, throwoff chute and an elevated walkway, Figure 22. It is used for scraping most of the remaining hair from the carcass, removing toenails and transferring carcasses to an overhead rail 9½ to 11 feet above the floor. Carcasses are moved along this overhead rail to each of the remaining work areas.

Singeing. The singeing area is approximately 3 by 4 feet in size and is used for burning most of the hair from the carcass which is not removed by the dehairing machine or manual scraping. This area is not a part of the mechanical line, Figure 23. There are usually 2 to 20 feet of overhead rail between the gambrelling and singeing areas. In one plant studied, a dipilatory operation was substituted for the singeing operation. This consisted of a vat containing a hot resin compound in which each carcass was dipped. When the compound cooled, it was peeled off by hand, thereby removing most of the remaining hair. Another vat was used to reheat the cooled compound when it is peeled from the carcass.

Wash. Approximately 12 feet of overhead rail space separate the singeing area from the wash area, which is about 4 by 8 feet in size. Space is provided within the area for washing each carcass. Two or more carcasses may be held in the area at one time. Some wash and singe areas are combined into one working area.

Eviscerating. An eviscerating area is located 2 to 15 feet from the wash area and ranges in size from about 4 by 5 feet to 4 by 8 feet. Additional space sometimes is provided for a work table for separating viscera or for containers to hold viscera.

Figure 22. Gambrelling area showing throw-off chute and overhead rail.

Carass splitting. The carcass-splitting area is usually about 4 by 6 feet in size, providing sufficient space for one worker to split one carcass. Three to 20 feet of overhead rail separate this area from the eviscerating area.

Leaf fat pull. This area, about 4 square feet, provides space for manually pulling the leaf fat from each carcass. Overhead rail lengths of 3 to 20 feet also separate this from the carcass-splitting area. Some plants combine the area with one of the other work areas.

Cleaning. The final cleaning and washing is accomplished in one area approximately 4 by 10 feet in size. Four or more feet of overhead rail separate this area from the leaf fat pulling area. A few plants also combine the cleaning area with other operational areas.

Weighing and inspection stamping. The weighing and inspection stamping area is usually the same area that is used for processing cattle and calves. A few feet of overhead rail usually separate this area from the cleaning area.

Figure 23. Portion of hog processing line. Singeing area in rear; wash and head removal in foreground.
Figure 24. Portion of sausage kitchen. Operator in foreground is preparing sausage ingredients for mixing.

CHILL ROOM

A few plants which slaughter a relatively large volume of hogs have rooms for chilling hogs; however, most plants use a portion of the cattle and calf chill room. Hog chill rooms usually are equipped with overhead rails 9 to 11 feet in height with the rails spaced from 2 to 2 1/2 feet from center to center. A minimum of 2 feet is allowed for clearance between walls and outer rails. Carcasses usually are held in the chill room for about 18 to 24 hours before they are moved to the cutting room. Construction of hog chill rooms is similar to that used for the cattle and calf chill rooms described previously. Chill rooms are located within the plant proper and range in size from 13 by 25 to 25 by 40 feet.

CUTTING ROOM

The hog cutting room, usually located near the chill room, is used for cutting the carcasses into wholesale cuts and preparing the cuts for other processing departments. Some plants may

Figure 25. Portion of sausage kitchen showing stuffing machine.

utilize another area, such as the shipping room, for this purpose.

The floors of cutting rooms usually are concrete and walls are either plastered or tiled to a height of 6 feet or more. Most of the ceilings are finished with plaster. Rooms may vary in size from 12 by 15 to 15 by 28 feet.

SAUSAGE KITCHENS

Sausage kitchens were located within the plant proper. Concrete floors, plaster ceilings and glazed tile walls are common interior finishes. They range in size from 20 by 30 feet for plants processing a small volume of sausage, to 30 by 40 feet for larger volume plants. Space is provided for the following equipment: chopping block, meat grinder, floor scales, silent cutter, mixer, stuffer, ice maker, linker and work tables. Working space also is provided for employees, as well as a storage room for smokehouse racks and containers. The rooms usually are refrigerated with small forced-air type units. The area is used for slicing and mixing meats for sausage and for stuffing and linking sausage, Figures 24 and 25.

CURING ROOM

Curing rooms are refrigerated and vary in size from 10 by 12 feet to 30 by 40 feet, depending on the volume of meat cured. The rooms are used for curing products such as hams, picnics, butts and slab bacon. Generally, they are located near the smokehouse or cutting room. Space is provided for one or more stainless steel vats, work tables, work space and a storage area for portable racks and containers. Interior finishes are similar to those found in cutting rooms.

SMOKEHOUSES

Smoke room facilities vary widely in type of construction. Some plants have rooms which are an integral part of the plant. Stainless steel doors often are used. The rooms vary in size and accommodate two to six smoke racks. Most plants have one to six rooms, depending on the volume of products processed. These structures have an adjoining smoke-generating room or firing pit which may be located beneath or contiguous to the smokehouse. Other plants had self-contained, all-metal smokehouses, Figure 26, and smoke-generating units which are classified as equipment rather than an existing plant structure. One to three smokehouses, usually about 9 by 10 feet in size, are used, depending on the volume of products processed.

The smoke-generating room generated smoke for the smokehouse. Space is provided for sawdust storage and a burning area for generating smoke. It is usually about 8 by 15 feet in size. A few plants utilize the all metal smoke-generating unit which requires a floor space from 2 feet square to 3 by 5 feet. In such cases, they
were located in an area adjoining the smokehouse and provided smoke for one to three smokehouses.

**SHIPPING ROOM**

Some of the packing plants which processed pork have shipping rooms. They vary in size from 15 by 25 feet to 20 by 50 feet and are located near the loadout dock. These rooms are used to perform different combinations of the following operations: cutting, wrapping, boning, packaging, order makeup and weighing. Plants which processed large volumes of sausage products had one or more rooms or working areas for each of these operations. Shipping rooms are refrigerated and usually are constructed similar to cooler rooms.

**LOADOUT DOCKS**

Packing plants which process pork products also have a loadout dock; however, it is used mainly for loadout operations. These docks are the same ones used for loading out beef and veal products, but all weighing is done in the shipping room.

**FREEZER ROOM**

Many of the packing plants which slaughter hogs have one or more freezer rooms. These rooms are constructed similar to the cooler rooms and are used for freezing various beef and pork products. Since all plants do not freeze their products, this room is used by plants specializing in this method of operation. Generally, two types of freezer rooms are found in these Texas packing plants; the “sharp” or natural air movement type, and the “quick” or air-blast type.

Freezer rooms range in size from 8 by 10 to approximately 20 by 60 feet. Overhead rails or storage racks, or a combination of both, are used for holding meat for freezing.

**RENDERING DEPARTMENT**

The rendering departments which are used in conjunction with plants slaughtering cattle, calves and hogs are similar in construction to the departments described under the cattle and calf section. Storage tanks for tallow are located outside of the building. These tanks usually are large enough to hold several weeks’ supply of tallow and are elevated to permit easy drainage.

**NONPROCESSING ROOMS**

All nonprocessing rooms located in plants slaughtering cattle, calves and hogs are the same as described previously under cattle and calf slaughter, with the exception of dry storage rooms. A greater number of dry storage areas are required in plants which process large volumes of pork products. These additional rooms are used for such purposes as spice storage, container and sausage rack storage and commercial product storage. The size and number of these rooms varies widely from plant to plant.
State-wide Research

The Texas Agricultural Experiment Station is the public agricultural research agency of the State of Texas, and is one of ten parts of the Texas A&M College System.

IN THE MAIN STATION, with headquarters at College Station, are 16 subject matter departments, 2 service departments, 3 regulatory services and the administrative staff. Located out in the major agricultural areas of Texas are 21 substations and 9 field laboratories. In addition, there are 14 cooperating stations owned by other agencies. Cooperating agencies include the Texas Forest Service, Game and Fish Commission of Texas, Texas Prison System, U. S. Department of Agriculture, University of Texas, Texas Technological College, Texas College of Arts and Industries and the King Ranch. Some experiments are conducted on farms and ranches and in rural homes.

THE TEXAS STATION is conducting about 400 active research projects, grouped in 25 programs, which include all phases of agriculture in Texas. Among these are:

- Conservation and improvement of soil
- Conservation and use of water
- Grasses and legumes
- Grain crops
- Cotton and other fiber crops
- Vegetable crops
- Citrus and other subtropical fruits
- Fruits and nuts
- Oil seed crops
- Ornamental plants
- Brush and weeds
- Insects
- Beef cattle
- Dairy cattle
- Sheep and goats
- Swine
- Chickens and turkeys
- Animal diseases and parasites
- Fish and game
- Farm and ranch engineering
- Farm and ranch business
- Marketing agricultural products
- Rural home economics
- Rural agricultural economics
- Plant diseases

Two additional programs are maintenance and upkeep, and central services.

Research results are carried to Texas farmers, ranchmen and homemakers by county agents and specialists of the Texas Agricultural Extension Service.

AGRICULTURAL RESEARCH seeks the WHATS, the WHYS, the WHEREs and the HOWS of hundreds of problems which confront operators of farms and ranches, and the many industries depending on or serving agriculture. Workers of the Main Station and the field units of the Texas Agricultural Experiment Station seek diligently to find solutions to these problems.

Today’s Research Is Tomorrow’s Progress