Changes have taken place in the processing as well as in the production and consumption of beef. In this chapter two points are emphasized:

1. The changes that have occurred at the packer level are significant.

2. In the general handling of beef, particularly the better grades of beef, the packer has the product for a very short period. His costs represent a small proportion of what the consumer pays for beef. Thus even spectacular cost-reducing efforts have very little effect on what the producer gets for his livestock or what the consumer pays for his beef.

I. Changes Outside the Plant

The United States has about 2,000,000 farms that sell cattle, about 3,000 commercial packing plants which process these cattle, and about 250,000 stores that sell the resultant beef to the 185,000,000 U.S. residents. The time required for processing and merchandising choice table beef averages about 18 months for the producer, and about 1 week (each) for the packer and retailer. The share of the consumer’s meat dollar going to each of the components, averages about 58% for the farmer and 14% for the packer, and 28% for the retailer.

<table>
<thead>
<tr>
<th>Farms Selling Cattle</th>
<th>Commercial Cattle Plants</th>
<th>Retailers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>2,000,000</td>
<td>3,000</td>
</tr>
<tr>
<td>Time Required to Process and Merchandise</td>
<td>18 Months</td>
<td>1 Week</td>
</tr>
</tbody>
</table>
Marketings. Cattle marketings are heaviest in the Central part of the United States. These marketings, as reported by the USDA, include stockers and feeders, and consequently marketings exceed the numbers of slaughter cattle. 3/

There is a tendency for cattle to be slaughtered reasonably close to where they are fed. The Northeastern United States, however, markets only about one-half as many cattle as it slaughters, and we can assume that the difference represents those shipped in. California and the rest of the West Coast also slaughter more cattle than are marketed in those states. Part of their cattle move out of the Pacific states; thus we can assume that the number of shipped-in slaughter cattle is somewhat greater than the difference between the number marketed and the number slaughtered. (See Fig. 1.)

Commercial Slaughter. Commercial slaughter of cattle increased in all regions of the United States between 1948-50 and 1961. But the North Central, N. W. had by far the largest increase, an advance of over 3 million head, or about 40% of the total U. S. increase of 7 1/2 million head. (See Fig. 2.)

Reporting by districts somewhat camouflages the changes going on in the states. For example, New England and New York show declines between these two periods of time, but these declines were more than offset by a doubling of slaughter in New Jersey and a substantial increase in Pennsylvania. The increase is small for the North Central-East due to the fact that Illinois alone showed a decline of 26%.

In 1961 the largest cattle slaughter states in the union were Iowa, California, Nebraska, Texas and Minnesota, in that order. These five states accounted for about 40% of the total commercial slaughter in 1961 and almost certainly a bigger percentage of the total federally inspected slaughter. (Figures on federally inspected slaughter (FIS) are not available by states.)

2/ USDA "Marketing & Transportation Situation," May 1962. Figures for 1961 reported in February 1962 (converted to retail weight) would be 49.2 for the producer, 5.1 for the slaughterers, and 24.9 for the retailer. These figures appear more realistic than those shown in the May 1962 release and included in the table above.

3/ There are no data available showing the current number of cattle, by districts or states, marketed directly for slaughter.

4/ Commercial slaughter includes all slaughter except farm slaughter.
MARKETINGS AND COMMERCIAL SLAUGHTER
OF U.S. CATTLE, 1961
(In thousands)

Total U. S. cattle marketings - - - - - - - - - - - - - - - - - - - - 34,378
Total U. S. cattle commercially slaughtered - - - - 25,610

Regional Areas:
A - Pacific
B - Mountain
C - South Central
D - North Central, S.W.
E - North Central, N. W.
F - North Central, East
G - North Atlantic
H - South Atlantic

M = marketings
S = slaughter

M 2,870
S 3,234

M 4,658
S 1,958

M 9,178
S 6,886

M 3,490
S 2,230

M 6,902
S 3,281

M 4,897
S 4,777

M 1,035
S 2,084

M 1,348
S 1,185
Fig. 2

INCREASE IN COMMERCIAL CATTLE SLAUGHTER
1948-50 to 1961
(in thousands and in percentages)

Total U.S. slaughter, 1948-50 . . . . . . 18,100
Total U.S. slaughter, 1961 . . . . . . 25,610
Increase, 1948-50 to 1961 . . . . . . 7,510
Percentage increase . . . . . . . . . . . . . . . 41%
The three contiguous states--Iowa, Nebraska and Minnesota--did 27% of the total commercial slaughter, and probably about 33% of the total FIS. (See Fig. 3.)

The three illustrations referred to show total slaughter and changes in the slaughter. What has been taking place with respect to the number of plants, their locations and average size?

**Number of Cattle Plants.** In 1960 there were 2,967 commercial plants which slaughtered cattle. Of these plants, 513 slaughtered only cattle and calves; the rest handled other species of livestock in addition.

About one-sixth of the total cattle plants (486) were federally inspected. The area locations of the commercial and the federally-inspected plants are shown in Fig. 4.

In the period 1955 to 1960, the total number of commercial cattle plants decreased by 144 units, while the federally-inspected plants increased by 66. All districts except the Mountain States, Kansas and Missouri, showed a decrease in the total number of commercial plants. All districts showed an increase in federally-inspected plants. The biggest increase in the number of federally-inspected plants was in the North Central, N.W. and in the South Central. (See Fig. 5.)

**Size of Cattle Plants.** The average size of all commercial cattle plants in 1961 was 8,600 cattle per year or about 165 cattle per week. The large plants tend to be located in the North Central, N.W. where the average size is about 43,000 cattle per year. (See Fig. 6.)

On the average federally-inspected plants are, of course, much larger than the commercial plants, and the largest FIS plants are located in the Cornbelt area. Note, too, that the average size of federally-inspected plants in all areas has decreased in the last five years. (See Fig. 7.)

**Ownership Decentralization.** While cattle slaughter plants have been increasing in numbers and decreasing in average size, there has been also a decline in the proportion of the total beef business handled by major packers. Data on cattle slaughter are not available for individual packers since 1955. However, the following figures show the change from 1947 to 1955:

---

5/ A commercial plant is defined by USDA as any plant which processes annually 300,000 pounds, or more of meat, live weight. In the case of cattle, this would mean a volume of about 300 head per year, and the definition would include almost all plants except some of the small locker plants, small retailer slaughtering, and farm butchering. Commercial plants include federally-inspected plants.
Slaughter of Cattle by Major Packers$^6/$
1947 and 1955

<table>
<thead>
<tr>
<th></th>
<th>1947 (000) Head</th>
<th>% of Total</th>
<th>1955 (000) Head</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Largest</td>
<td>8,225</td>
<td>39%</td>
<td>7,915</td>
<td>31%</td>
</tr>
<tr>
<td>5 Through 8</td>
<td>956</td>
<td>4%</td>
<td>1,597</td>
<td>6%</td>
</tr>
<tr>
<td>Total of 8</td>
<td>9,181</td>
<td>43%</td>
<td>9,512</td>
<td>37%</td>
</tr>
</tbody>
</table>


Part of this decentralization of ownership is indicated by the loss of slaughter at principal terminal markets.

Changes at terminal markets. While it is not possible to generalize, the importance of some of the terminal markets as cattle slaughtering points declined sharply. Chicago, for example, handled almost 10% of the commercial slaughter of cattle in 1940. By 1960, it had a volume of less than 3% of the total. St. Louis National Stockyards' proportion of the total slaughter in 1960 was only one-fifth of what it was in 1940. The proportion for Cincinnati, Forth Worth and Indianapolis dropped to about one-half of what it was 20 years earlier.

On the other hand, some of the terminals located close to the big cattler feeding areas have increased their relative importance in cattle slaughtering: Omaha, St. Joseph, Sioux City and Denver increased their shares of the total cattle volume between 1940 and 1960. (See figures on the following page.)
COMMERCIAL CATTLE SLAUGHTER IN KEY STATES

Million Head in 1961 and

Percent Change from 1948-50

U.S. slaughter, 1961 25.6 million
Top 10 states slaughter, 1961 16.2 million
U.S. change from 1948-50 41%
Top 10 states change from 1948-50 46%
Fig. 4

TOTAL NUMBER OF COMMERCIAL AND FEDERALLY INSPECTED CATTLE PLANTS, 1960

C = commercial
F = federal

Total U.S. commercial cattle plants 2,967
Total federally-inspected cattle plants 486
CHANGE IN NUMBER OF COMMERCIAL AND FEDERALLY-INSPECTED CATTLE PLANTS
1955 to 1960

Total Commercial Plants:
1955 ........ 3,071
1960 ........ 2,967
Decrease ...... 104

Total F.I.S. Plants:
1955 ...... 420
1960 ...... 486
Increase ...... 66

C = commercial
F = federal
SIZE OF COMMERCIAL CATTLE PLANTS

Average Number of Cattle Slaughtered Per Plant, 1961 and Percent Change from 1956

U.S. Average ........... 8,640

% Change ............... -1
SIZE OF FEDERALLY-INSPECTED CATTLE PLANTS

Average Number of Cattle Slaughtered Per Plant, 1961 and Percent Change from 1956

U.S. Average .... 41,088
% Change ....... -15
### Cattle Slaughter at Selected Terminal Markets

Compared with Total Commercial Slaughter, 1940 vs. 1960

<table>
<thead>
<tr>
<th>Location</th>
<th>Thousand Head 1960</th>
<th>Thousand Head 1940</th>
<th>% of Total 1960</th>
<th>% of Total 1940</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicago</td>
<td>723.7</td>
<td>1,336.9</td>
<td>2.9%</td>
<td>9.3%</td>
</tr>
<tr>
<td>S. St. Paul</td>
<td>790.7</td>
<td>549.8</td>
<td>3.1%</td>
<td>3.8%</td>
</tr>
<tr>
<td>St. Louis NSY</td>
<td>186.5</td>
<td>535.2</td>
<td>.7%</td>
<td>3.7%</td>
</tr>
<tr>
<td>Omaha</td>
<td>1,430.7</td>
<td>749.3</td>
<td>5.7%</td>
<td>5.2%</td>
</tr>
<tr>
<td>Kansas City</td>
<td>687.5</td>
<td>544.2</td>
<td>2.7%</td>
<td>3.8%</td>
</tr>
<tr>
<td>Sioux City</td>
<td>748.7</td>
<td>372.8</td>
<td>3.0%</td>
<td>2.6%</td>
</tr>
<tr>
<td>Denver</td>
<td>581.2</td>
<td>175.2</td>
<td>2.3%</td>
<td>1.2%</td>
</tr>
<tr>
<td>Milwaukee</td>
<td>306.8</td>
<td>175.0</td>
<td>1.2%</td>
<td>1.2%</td>
</tr>
<tr>
<td>St. Joseph</td>
<td>649.8</td>
<td>231.5</td>
<td>2.6%</td>
<td>1.6%</td>
</tr>
<tr>
<td>Cleveland</td>
<td>244.0</td>
<td>100.0</td>
<td>1.0%</td>
<td>.7%</td>
</tr>
<tr>
<td>Detroit</td>
<td>243.0</td>
<td>179.4</td>
<td>1.0%</td>
<td>1.2%</td>
</tr>
<tr>
<td>Fort Worth</td>
<td>224.3</td>
<td>256.3</td>
<td>.9%</td>
<td>1.8%</td>
</tr>
<tr>
<td>Oklahoma City</td>
<td>226.1</td>
<td>158.8</td>
<td>.9%</td>
<td>1.1%</td>
</tr>
<tr>
<td>Cincinnati</td>
<td>184.7</td>
<td>190.4</td>
<td>.7%</td>
<td>1.3%</td>
</tr>
<tr>
<td>Indianapolis</td>
<td>159.6</td>
<td>174.3</td>
<td>.6%</td>
<td>1.2%</td>
</tr>
<tr>
<td>Memphis</td>
<td>73.2</td>
<td>118.0</td>
<td>.3%</td>
<td>.8%</td>
</tr>
<tr>
<td>New York</td>
<td>35.0</td>
<td>25.7</td>
<td>.1%</td>
<td>.2%</td>
</tr>
</tbody>
</table>

---

The Mix of Cattle. The mix of cattle has also been changing. In 1944 cows and bulls represented about 30% of our bovine supply. By 1961 they had fallen to 17%. Steers and heifers moved from 34% to 63% in the same period. To meet the needs of retailers many slaughterers established direct contact with feeders or set up their own feed yards.

FEDERALLY-INSPECTED SLAUGHTER OF CATTLE & CALVES: 8/

<table>
<thead>
<tr>
<th>By Kind, % of Total Numbers</th>
<th>1944</th>
<th>1961</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cows</td>
<td>27%</td>
<td>16%</td>
</tr>
<tr>
<td>Bulls</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Calves</td>
<td>36</td>
<td>20</td>
</tr>
<tr>
<td>Steers</td>
<td>27</td>
<td>45</td>
</tr>
<tr>
<td>Heifers</td>
<td>7</td>
<td>18</td>
</tr>
</tbody>
</table>

The number of steers increased by 91% in this 15-year period, and heifers by 188%. Calves, cows and bulls all declined on an absolute basis and declined even more in relative terms. Of particular significance is the fact that the 15% increase of F.I.S. bovine animals represented an increase of 68% in total beef and veal supply, and gives an indication of the tremendous increase in efficiency at the farm level.

FEDERALLY-INSPECTED SLAUGHTER OF CATTLE & CALVES: 8/

<table>
<thead>
<tr>
<th>By Kind, No. of Head &amp; % Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Steers (000)</td>
</tr>
<tr>
<td>Heifers (000)</td>
</tr>
<tr>
<td>Calves (000)</td>
</tr>
<tr>
<td>Cows (000)</td>
</tr>
<tr>
<td>Bulls &amp; Stags</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

8/ "Annual Livestock and Meats Statistics," Agricultural Marketing Service, USDA
Factors Behind the Changes. Now for a moment, let's consider quickly why some of these changes have occurred.

1. Slaughter has moved out of some of the former major centers because of difficulty of procuring cattle and the relative shift in the transportation costs of moving cattle vs. meat.

2. Labor situations in some of the big centers have also been a factor. Packers have built smaller plants in smaller population centers to utilize high grade labor.

3. The higher incomes of an ever-increasing population have increased the demand for high grade beef. The type of cattle now in demand tend to be found primarily in the large surplus feed-producing regions of the United States and plants have been located close to the supply of fed cattle because of the economics mentioned.

4. Federally-inspected plants have increased relative to the total number of plants. This has happened not because of greater efficiencies or because such plants could perform more work at a lower average cost but because of the economics of locating plants in the surplus beef producing areas. The beef moves from these plants to deficit producing areas, and to cross state lines it must be produced in federally-inspected plants.

Actually, federally-inspected plants probably tend to have somewhat higher operating costs than non-federally inspected plants. There are several reasons:

a. FIS plants have more costly structures and equipment. (Such are required by government standards.)

b. Being larger in size, they are more likely to be unionized, with higher pay scales.

c. Smaller plants, even if unionized, are more likely to have a lower wage scale than large ones. (Comprehensive data on this point, however, are lacking.)

5. The average size of federally-inspected plants has tended to decline in recent years.

a. Some of the other plants, which on the average are smaller than the inspected ones, have acquired inspection.

b. Obsolescence factors and resulting high costs have induced some owners of large beef slaughtering plants to discontinue operations
or to curtail volume sharply.

c. Many new plants have been built in recent years. But because there appears to be no major economies in very large size and because large plants are vulnerable to a shift in cattle supplies, these new plants have tended to be smaller on the average than many of the plants which have gone out of business.

6. Ownership decentralization has occurred because of several factors:

a. Government grading, which gives a new firm an acceptable and highly recognizable brand, makes for ease of entry.

b. World War II controls tended to bear somewhat more heavily on the large firms and thus provided an opportunity for small and new firms to expand relatively.

c. Because of low margins, there have been no special incentives for large packers to attempt to hold their relative volume positions during the period of rapidly expanding beef production.

II. Changes Within the Plant

Packers have promoted research in the beef area largely to reduce costs rather than to increase product demand. This has probably happened because there have been many opportunities to reduce costs through new layouts, improved machinery, and new plant designs, whereas demand-inducing research is difficult and the results less sure. The rapid rate at which wage costs have advanced in the postwar period has provided a strong incentive to substitute capital for labor. Also to increase the output per employee or per work hour through the establishment of work standards and incentive pay.

And the industry has made progress! This is attested by the fact that from 1947 to 1961 meat output increased by 29% while the number of production workers decreased by about 13%. It is difficult to determine, however, if these percentage changes reflect the improvement in efficiency. A major part of the increase in meat output has been in the production of beef. But beef requires relatively little labor in the meat packing plant. On the other hand, there has been a large increase in the volume of processed products and in consumer packaging, both of which require increased labor inputs.

Data compiled by the Agricultural Marketing Service, USDA, show that between 1947-49 and 1958, the relative increases in efficiencies in various food industries were as follows:
<table>
<thead>
<tr>
<th>Industry</th>
<th>Percentage Increase In Efficiencies 1947-49 to 1958</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proc. Fruits, Vegetables</td>
<td>141</td>
</tr>
<tr>
<td>Sugar</td>
<td>139</td>
</tr>
<tr>
<td>Manufactured Dairy</td>
<td>131</td>
</tr>
<tr>
<td>Grain Mill</td>
<td>131</td>
</tr>
<tr>
<td>Confectionery</td>
<td>126</td>
</tr>
<tr>
<td>MEAT</td>
<td>124</td>
</tr>
<tr>
<td>Bakery</td>
<td>118</td>
</tr>
<tr>
<td>Avg. All Foods</td>
<td>130</td>
</tr>
</tbody>
</table>

Regardless of how much efficiency has increased in the meat packing industry, the wage cost has undoubtedly advanced more rapidly. The following figures show the percentage change in meat production and total wage costs, 1947 to 1961:

Indexes of Commercial Meat Production and Total Production Workers' Wage Costs, 1947 to 1961

<table>
<thead>
<tr>
<th>Year</th>
<th>Meat Production</th>
<th>Total Wage Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1947</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>1954</td>
<td>112</td>
<td>147</td>
</tr>
<tr>
<td>1958</td>
<td>115</td>
<td>164</td>
</tr>
<tr>
<td>1961</td>
<td>129</td>
<td>180 (Est.)</td>
</tr>
</tbody>
</table>

Just a year ago, the U. S. Department of Labor stated: "Production workers in meat packing plants are among the most highly paid in manufacturing, with weekly earnings in the industry about one-fourth more than the average manufacturing level."\(^9\)

Rail dressing. One attempt to offset the increasing labor cost is the rail system of dressing cattle. This has been one of the most noteworthy technological advances in processing beef in many years. Data released by the Meat Inspection Division of the USDA gave the following information for 1961:

- 19 plants have the hide pulling system
- 2 plants have skinning conveyors
- 40 plants have on-the-rail dressing
- 428 plants have the conventional system

489 total plants

More recently several additional rail dressing systems reportedly have been installed. New plants designed to handle 20 or more cattle per hour would, with few exceptions, provide for rail dressing. 10/

How big are the savings from the rail dressing system compared with the old bed system? Probably not as large as most people would think. The total amount of labor expended in dressing beef is relatively small, running in the range of 50 to 70¢ per live cwt., depending on wage costs. The rail dressing system is designed to reduce the labor force by about 15-20%. Thus, we would not expect the labor cost of dressing to be reduced by more than 10-15¢ per live cwt., and for most plants probably no more than 5-10¢.

In order to make this small reduction in labor costs possible, a company with a conventional bed system must undertake a substantial investment, amounting to perhaps as much as a quarter million dollars, to switch from one system to the other at a slaughter rate of about 40 cattle per hour. For new plants being built, the additional costs of the rail system would naturally be considerably lower. Now, if the net decrease in cost from the rail dressing system is 10-15¢ per live cwt., this would amount to less than three-tenths of a cent a pound at the retail level, certainly not large enough to have any big effect on the demand for beef.

10/ In this presentation, a short movie film produced by Canada Packers and showing the Can-Pak system of rail dressing was presented. In general, rail dressing provides for conveyors which move the cattle carcasses to work stations. The complete system also provides for hydraulic lifts, worker platforms which can be elevated, hydraulic hide pullers, automatic washers, and moving viscera conveyors. (The film noted above is obtainable through the Allbright-Nell Co., Chicago.)
III. Possible Future Trends

Consideration of the trends which have been developing in the procurement and processing of beef indicates that the industry may move as follows:

1. Because of economies of transportation, slaughtering plants are likely to move still closer to the cattle supply. This means closer to the feed producing areas.

2. Federally-inspected plants are likely to become more important relative to the total number of plants because of the increasing need to move beef across state lines and because of government pressure for better inspection of the food supply.

3. Direct buying of cattle will naturally increase as more plants are established in the areas of cattle feeding.

4. There will probably be an increase in informal integration between the packer and feeder. Slaughterers will depend more and more on the same suppliers for their livestock, and these suppliers will know the specification requirements of the slaughterer and will produce for his needs. Specification requirements will probably cause some increase in packer feed lots and in contract feeding.

But it is doubtful that there will be any major increase in the near future in that type of integration under which feed companies or slaughterers supply capital and management to present cattle feeders. These cattle feeders are not in need of either of these resources from feed or processing companies.

5. Carcass buying of cattle can be expected to increase in importance. This is because yields in live cattle are difficult to estimate and grading can be more effectively done in carcasses than in live animals. Also the general trend of American business is toward more confidence. As large feeders of cattle identify themselves more and more with the one or two or only a few slaughterers they will see the merits in obtaining what their livestock are really worth rather than a buyer's estimate of the finished value based on inspection of the live animal.

6. There is likely to be more fabrication of beef in the packing plants because:

   a. This will reduce the total amount of product shipped and thus have a bearing on cost.

   b. By-products should be better utilized at the packing centers.

   c. The packer will see that his only opportunity to widen his margins
is to produce consumer-identified items.

d. The government--federal or state or both--is going to insist on better inspection of meats. Inspection is much more readily accomplished at 3,000 packing plants than at 250,000 retail stores.

7. Decentralization of ownership is likely to continue. But this trend will be slowed and reversed if packers succeed in developing packer identification which carries through to the consumer.

8. The spread between what the producer receives on the one hand and what the retailer pays on the other will increase. The packer will be performing more functions, and he is not likely to have any big breakthrough in reducing costs of present functions.

Sources of material other than those previously indicated:

1. Data for Figures 1 and 2 from "Livestock and Meat Statistics," USDA.

2. Data for Figure 3 from "Commercial Livestock Slaughter and Meat Production," USDA.

3. Data for Figures 4 and 5 are from "Number of Livestock Slaughter Plants," March 1960, USDA.

4. In calculating the average size of plants, the number of plants in 1955 and 1960 were used in conjunction with slaughter in 1956 and 1961.