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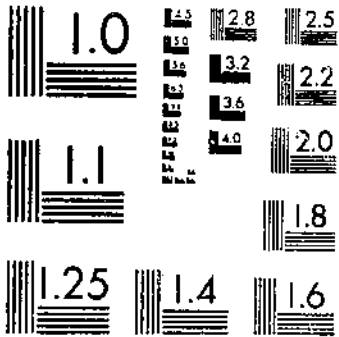
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MARKETING MARGINS AND COSTS FOR LIVESTOCK AND MEAT

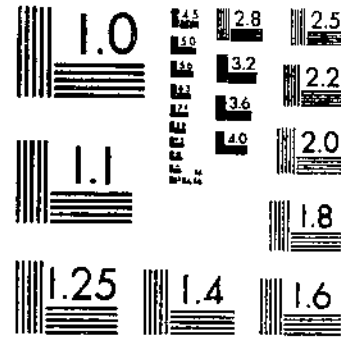
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**UNITED STATES  
DEPARTMENT OF AGRICULTURE  
WASHINGTON, D. C.**

# Marketing Margins and Costs for Livestock and Meat<sup>1</sup>

By KNUTE BJORKA, *Agricultural Economist,*  
*Bureau of Agricultural Economics*

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## INTRODUCTION

The aggregate marketing and processing margin for livestock and meat, consisting of costs and profits, is the difference between the amount paid by consumers and other users for the products and that received by

<sup>1</sup> Submitted for publication December 12, 1945.

producers for the livestock from which the products are obtained. This margin logically divides itself into separate margins for performing such different broad functions as marketing livestock, meat packing, and wholesale and retail distribution of the products.

The costs or expenses incurred in marketing and processing livestock and meat bear a relationship to the channels through which the animals and products move, and to the services rendered. In the marketing of livestock, the services may be assembly at local or intermediary points, handling, caring for and selling at markets, and transportation. In the sale of some livestock, substantially all of the marketing services are performed by the farmer himself, in which case no payment is made to others. The more common practice, however, is for a farmer to delegate some or all of the marketing services to others, for which fees and charges are paid.

Meat packing includes slaughtering and processing. Processing involves such functions as cutting, boning, curing, smoking, cooking, canning, making sausage and prepared meats, rendering lard, freezing, and dehydrating. The cost of meat packing is affected considerably by the kind and degree of processing done and by the form in which meat is distributed.

Most of the meat is distributed through both wholesale and retail markets. If the meat is consumed a considerable distance from where it is processed, the transportation is a considerable item of cost. The cost of distribution is affected not only by the specific marketing channels through which the meat is moved, but also by the kind and amount of processing, and other services performed by wholesaling and retailing agencies. Direct sales of meat from processors to consumers are relatively unimportant, except sales to hotels, restaurants, steamship lines, and institutions.

In 1939, the meat sold at retail had an estimated value of 3,913 million dollars. The total bill for marketing and processing livestock and meat (exclusive of that allocated to inedible byproducts) was 1,917 million dollars. Of this total, 939 million dollars was for retail distribution of meat, and 227 million dollars for wholesaling meat. The estimated amount deducted for slaughtering and processing was 583 million dollars allocated to meat and an additional 65 million dollars allocated to inedible byproducts, making a total of 648 million dollars. Expenses for marketing livestock, including transportation, were estimated at 187 million dollars (168 million dollars allocated to meat and 19 million dollars to inedible byproducts). The sum of 2,218 million dollars was paid farmers for livestock (1,996 million dollars allocated to meat and 220 million dollars to inedible byproducts).

Information on marketing margins and costs for livestock and meat has long-time importance as a basis for developing effective research. Such research would be designed for use in formulating plans to increase efficiency and to reduce the costs of marketing and processing. The information permits comparisons to be made of the cost of marketing livestock through different types of markets and to evaluate these costs in the light of the services performed at each. Information on the cost of processing can be related to the type of processing, and information on the cost of distribution of meat to the method of distribution.

### PURPOSE OF STUDY AND NATURE OF DATA

The primary purpose of this bulletin is to bring together and coordinate the available data bearing on the problem of margins and costs of marketing and processing livestock and meat. The base period for the study is 1939, the last year representing "normal" peacetime conditions. Much of the available information pertains to segments of this problem, and these segments are combined in arriving at the margins for performing the various marketing and processing functions. Information is more complete and more reliable for some phases of the problem than for others. For some segments, data are practically nonexistent, and estimates have had to be made in order to attain completeness. In other cases, the available data did not apply to the base year and it was therefore necessary to make adjustments in order to attain comparability. Information from a large number of sources was used, most of which was in published form.

### PROBLEM OF DETERMINING MARGINS AND COSTS FOR LIVESTOCK AND MEAT

The problem of dividing the consumer's dollar spent for meat into the proportions that go for performing the functions of marketing livestock, meat packing, wholesaling, and retailing involves innumerable complications. The livestock sold by a farmer is a different commodity from the meat bought by a consumer. Slaughtering yields a carcass that weighs considerably less than the weight of the live animal. The processing generally also reduces the weight of meat, although in some cases the weight is increased. The animal when slaughtered yields many byproducts, both edible and inedible. Some of these are processed by the concern that slaughters, and others are sold in the raw state to other processors. The edible byproducts are mostly marketed through the same channels as the meat, but the inedible byproducts usually are sold through other channels. Important inedible byproducts are hides, pelts, grease, pharmaceuticals, and materials for the manufacture of animal feeds and fertilizers.

The carcass decreases further in weight when it is cut up for the retail trade, owing to loss of moisture and to normal cutting losses, trimming, and boning. The different retail cuts vary widely in value. Some trimmings such as tallow, tendons, and bones resulting from boning are inedible and of low value. All this greatly complicates the pricing of meat.

Meat from animals of different species are in some respects dissimilar. The animals tend to vary in dressing yield, the carcasses may be cut differently, the extent to which meat is processed and the kind of processing done may be different, and the byproducts have different values. A considerable part of the pork carcass is cured and smoked, whereas carcasses of beef, veal and lamb are mostly sold fresh. More beef than other meat is boned. Packers make hamburger, various kinds of sausage, and other prepared meats. Some processing and fabrication of cuts of meat also are done by other wholesalers and retailers.

Packers also process and handle products other than meat, such as lard, butter, oleomargarine, cheese, poultry, eggs, fish, and other seafood. Then, too, all the meat produced from slaughter at packing plants is not distributed to consumers through retail stores. Some is sold at wholesale to hotels, restaurants, institutions, and steamship companies, either by the packers or by other wholesaling agencies. Some is sold by packers in relatively large lots to concerns that manufacture sausage and other prepared meats but that do no slaughtering. Much of the meat retailed is sold through combination meat and grocery stores which handle innumerable other products. Even in regular meat markets, such products as poultry, fish, other seafood, butter, and cheese are generally sold.

With a problem as complex as this it is obvious that the margins for the various marketing and processing functions cannot be determined with mathematical precision. The detailed data pertaining to the various phases of the problem are limited both in amount and in their refinement. All that can be hoped for in a study of this kind is to bring together the best available information on the subject, and to determine average margins and costs. The margins derived should be considered approximate; therefore they have their limitations. But for practical purposes they should be useful as general indicators of the relative size of the margins taken for performing the various functions of marketing and processing livestock and meat.

### CHANNELS OF MARKETING

In a study of the cost of marketing livestock and meat it is important to show the channels through which the commodities move from the farm to the consumer, to point out the characteristics of the various types of markets used, to indicate what agencies operate at each type of market, and to describe the services they render in order that the costs of the services provided at each market may be appraised more accurately. Full knowledge of the operations at the various types of markets is essential as a basis for suggesting improvements in marketing methods and practices, and for reducing marketing costs. As livestock and meat are disposed of through different markets, transported in different types of equipment, and handled under different conditions, the channels through which they are distributed are shown separately.

#### MARKETING CHANNELS FOR LIVESTOCK

Livestock sold by farmers may move through several intermediate handlers on its way to final destination. This applies particularly to slaughter livestock, and to stockers and feeders. Breeding and dairy animals are likely to move directly to final purchasers. In the 14 States included in a study made in the Corn Belt region, by the Corn Belt Livestock Marketing Research Committee, about 24 percent of all livestock sold (combined in terms of earlot equivalents) moved direct from farms to packing plants, feedlots, and other farms without going through any market in 1940 (table 1) (6).<sup>2</sup> About 40 percent of all livestock sold in the region passed through terminal public markets only,

<sup>2</sup> Numbers in parentheses refer to Literature Cited, page 100.

28 percent passed through one or more types of local markets but not through a terminal market, and 8 percent passed through both local and terminal public markets.

TABLE 1.—Channels through which livestock passed from farmers to packing plants, other farmers, and other users, by species, 1940

Marketing channels	Cattle and calves	Hogs	Sheep and lambs	All livestock (carlot equivalent) <sup>1</sup>
	Percent	Percent	Percent	Percent
Not going through markets.....	23	25	24	24
Through terminal public markets only.....	44	36	45	40
Through one or more types of local markets but not through terminal markets...	24	32	26	28
Through both local and terminal public markets .....	9	7	5	8
Total.....	100	100	100	100

<sup>1</sup> Percentages for all livestock combined derived by weighting the different species by volume according to carlot equivalents.

Data for cattle and calves, hogs, and sheep and lambs from Corn Belt Livestock Marketing Research Committee (6, p. 28).

The channels of marketing and the relative importance of the different types of markets used for the livestock sold in the Corn Belt region in 1940 are shown in figure 1 (6).<sup>3</sup> In terms of carlot equivalents, cattle comprised 35 percent, calves 11 percent, hogs 45 percent, and sheep and lambs 9 percent. These relationships generally vary somewhat from year to year. In 1939, the base year for this study, the consist of livestock marketed was comprised of cattle 38 percent, calves 12 percent, hogs 40 percent, and sheep and lambs 10 percent.

Cattle, calves, and sheep and lambs were marketed through terminal public markets in larger proportions than hogs. Hogs were sold in relatively large proportions through local markets, and direct to packers. Some livestock moved through more than one market of the same type, but this is not shown in the figure. Indications are that livestock outside the Corn Belt region are marketed through somewhat similar channels, but data on the relative importance of the different types of markets used are not available.

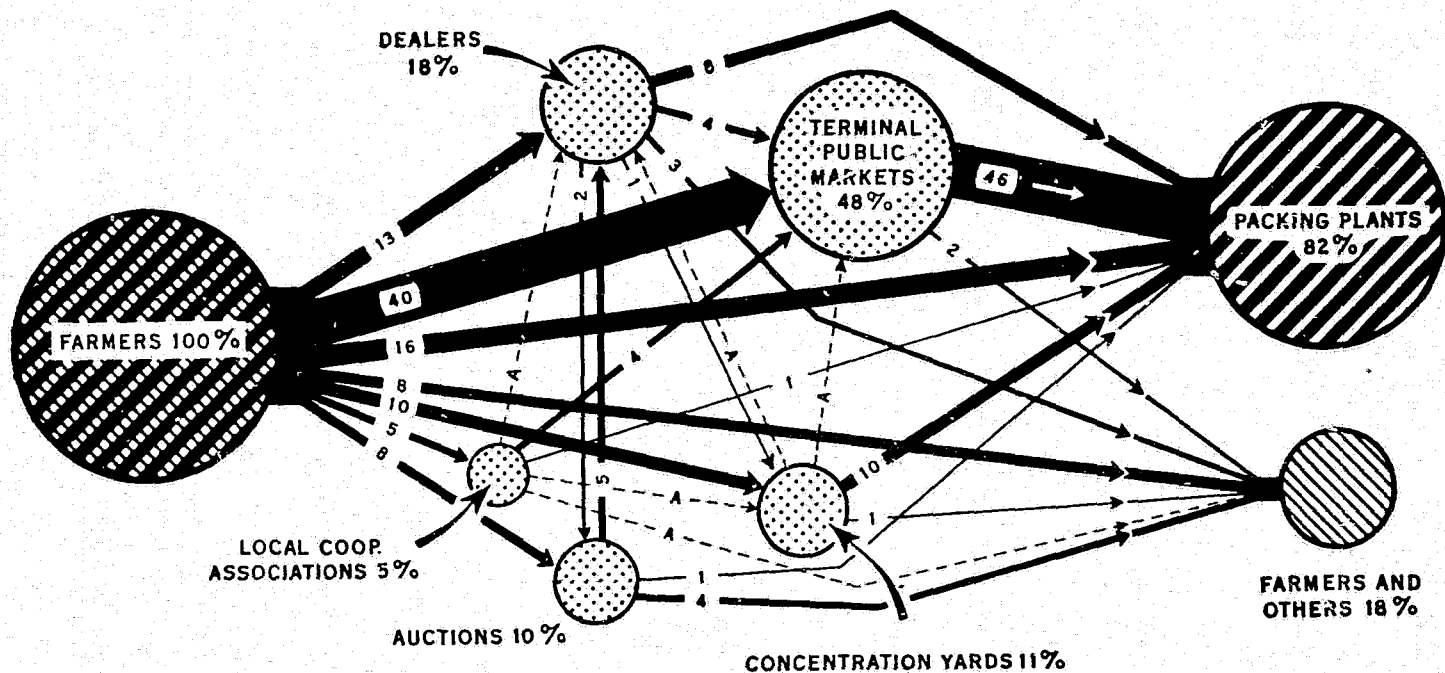
Eighty-two percent of the livestock (exclusive of horses and mules) sold by farmers in the Corn Belt region went to packing plants for slaughter. The other 18 percent was composed of stocker and feeder animals that went to farms and feedlots, animals sold for breeding and dairy purposes, and some animals sold for slaughter to retail meat dealers and other users.

#### MARKETING CHANNELS FOR MEAT

The tonnage of meat marketed is considerably smaller than the tonnage of livestock. This difference in weight is accounted for both by the fact that some of the livestock marketed does not go to slaughtering plants and that dressing losses result from slaughtering. Of the livestock slaughtered in packing plants in 1939, as reported by the census, the

<sup>3</sup> Corresponding illustrations showing the channels of marketing for cattle and calves, hogs, and sheep and lambs separately are shown in the publication listed (6).





BAE 42,910A

FIGURE 1.—CHANNELS OF LIVESTOCK MOVEMENT FROM FARMS IN THE CORN BELT REGION TO PACKING PLANTS, FARMERS, AND OTHER USERS, 1940.

Of all livestock combined (based on carlot equivalents) marketed by farmers in the region, 82 percent went to packing plants for immediate slaughter and 18 percent to farmers and others. Cattle, calves, and sheep and lambs were sold through terminal public markets in relatively larger proportions than hogs. Hogs were sold direct to packers and through concentration yards in relatively larger proportions than the other livestock.

average dressing yield was 62 percent of the live weight (table 2) (32). Dressing yields varied considerably by species of animals. The lowest was 47 percent for sheep and lambs, and the highest 73 percent for hogs.

TABLE 2.—Number, weight, and dressing yield of animals slaughtered for own account in 1,478 meat packing establishments, 1939

Species	Head	Weight on foot	Weight dressed	Average weight		Dressing yield
				On foot	Dressed	
	<i>Number</i>	<i>1,000 pounds</i>	<i>1,000 pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Percent</i>
Cattle .....	11,855,339	10,935,770	5,820,615	922	491	53.2
Calves .....	6,445,859	1,202,045	726,029	186	113	60.4
Hogs .....	46,515,414	10,692,706	7,825,369	230	168	73.2
Sheep and goats....	19,639,449	1,670,636	790,492	85	40	47.3
Total.....	.....	24,501,157	15,162,505	.....	.....	61.9

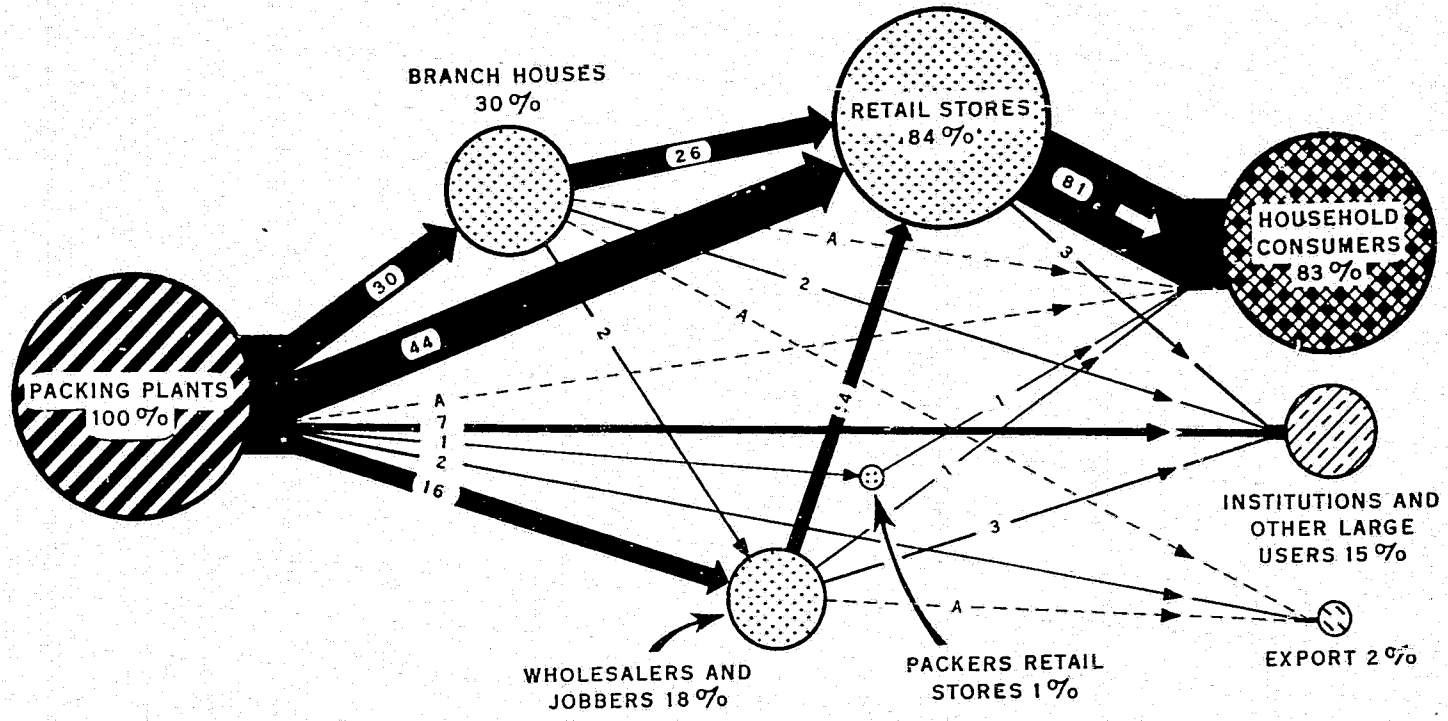
From United States Bureau of the Census (32, pp. 60-61).

Of the estimated production of 17,534 million pounds of meat in 1939, 88 percent was produced from slaughter in commercial establishments and 12 percent from farm slaughter. Commercial slaughter included slaughter in federally inspected plants and slaughter in both wholesale and retail plants not under Federal inspection.<sup>4</sup> The meat produced from commercial slaughter that year was made up of beef 44 percent, veal 6 percent, pork (exclusive of lard) 45 percent, and lamb and mutton 5 percent. The meat produced from farm slaughter was estimated as follows: Beef 11 percent, veal 4 percent, pork (exclusive of lard) 84 percent, and lamb and mutton 1 percent. Most of the meat from farm slaughter ordinarily is consumed on farms but some is sold to retail establishments or direct to consumers.

Of the meat and meat products produced in wholesale packing establishments and in sausage and prepared-meats processing plants, approximately 84 percent (in terms of value) was distributed through retail stores in 1939 (fig. 2) (30). Forty-four percent of the meat moved to retail stores direct from packing plants, and 26 percent through branch houses owned and operated by packers. Fourteen percent of purchases by retailers were obtained from independent wholesalers and jobbers. Sales direct from packing plants to consumers, which involved primarily institutions and other large users of meat, were equal to about 7 percent of the total. Only 2 percent of the total meat produced in packing plants was exported. Most of the meat handled in retail stores was sold to household consumers. Only a small proportion was sold by retail stores to institutions, to industrial consumers, and to other large users. The proportion of the total meat taken by institutions and other large users apparently has increased since 1939.

A considerable volume of products normally moves from one packing plant to another plant, and some products move from one agency to another agency of the same type, but this movement is not shown in figure 2. In 1939, the volume of meat transferred from one packing plant to another was equal to nearly 11 percent of the total meat and meat products produced in the wholesale packing establishments (30). Some

<sup>4</sup> The classification of slaughter was modified somewhat during the war.



BAE 45,696  
 -- A -- Less than 0.5 percent  
 Figures on lines are in percentage  
 FIGURE 2.—CHANNELS OF MOVEMENT OF MEAT AND MEAT PRODUCTS FROM PACKING PLANTS TO CONSUMERS AND OTHER USERS, BASED ON VALUE OF PRODUCTS, 1939.  
 Of the meat and meat products produced in packing plants, 83 percent was bought by household consumers, 15 percent was bought by institutions and other large users, and 2 percent was exported. Meat-packing concerns wholesale most of their own meat. Less than one-fifth of the total was handled by independent wholesalers and jobbers in 1939.

of this, apparently, represented transfer of meat between plants owned by the same concern. The transfer between plants was relatively more important for pork than for other meat, amounting to about 15 percent of the dressed pork produced in the packing plants. For beef, it comprised 7 percent, veal 6 percent, and mutton and lamb 2 percent. In some packing plants, operations are confined to killing and dressing livestock, and the carcasses are shipped to other plants for cutting and distribution, and perhaps for processing. It is not uncommon for a packer when he finds his stock disproportionate to demand on certain cuts, to buy from or sell to other packers. One wholesale distributor may at times sell meat to other wholesalers, but the transfer of meat among different branch houses, or among different retail stores, is not common.

### COMBINED MARGIN AND COSTS FOR MARKETING AND PROCESSING LIVESTOCK AND MEAT

As both livestock and meat are moved through several channels the average margin and costs for individual lots of these commodities may vary at any given period. The margin and costs, also, may vary from one period to another, being affected by such factors as the level of prices, the volume of supplies, the relative proportions of the different species of livestock and meat, wage rates, and other costs. Over longer periods, margin and costs may be affected by changes in the channels of marketing, by shifts in areas of production or of consumption, and by modifications in methods and practices employed in marketing and processing.

### TRENDS IN SPREAD BETWEEN PRICES OF LIVESTOCK AND RETAIL MEAT

The spread between the price of livestock and the retail price of meat, as used in this bulletin, refers to the price of the number of pounds of live animals required on an average to produce 1 pound of meat to be sold at retail compared with the retail price of 1 pound of meat after adjusting for value of byproducts. This spread, or margin, represents the total amount absorbed for marketing and processing livestock and meat.

The marketing and processing margin, and the share returned to producers as payment for livestock for the period 1913-44 (fig. 3) are based on two price series, each of which is obtained independently of the other by different agencies (25). The retail meat price series is a composite of retail prices of several cuts of meat, weighted according to their relative importance. The prices are collected by the Bureau of Labor Statistics, and normally apply to meat that grades "Good." The series of livestock prices are based on the average prices received by farmers for beef cattle, veal calves, hogs, sheep, and lambs, as reported monthly to the Bureau of Agricultural Economics, after adjusting for value of byproducts. This is done by reducing the reported farm value of livestock by the imputed value of the byproducts at the farm level. The average dressing percentage for each species of livestock was used in adjusting the price of livestock to a retail meat price basis.

Normally, the spread between the farm value of livestock and the

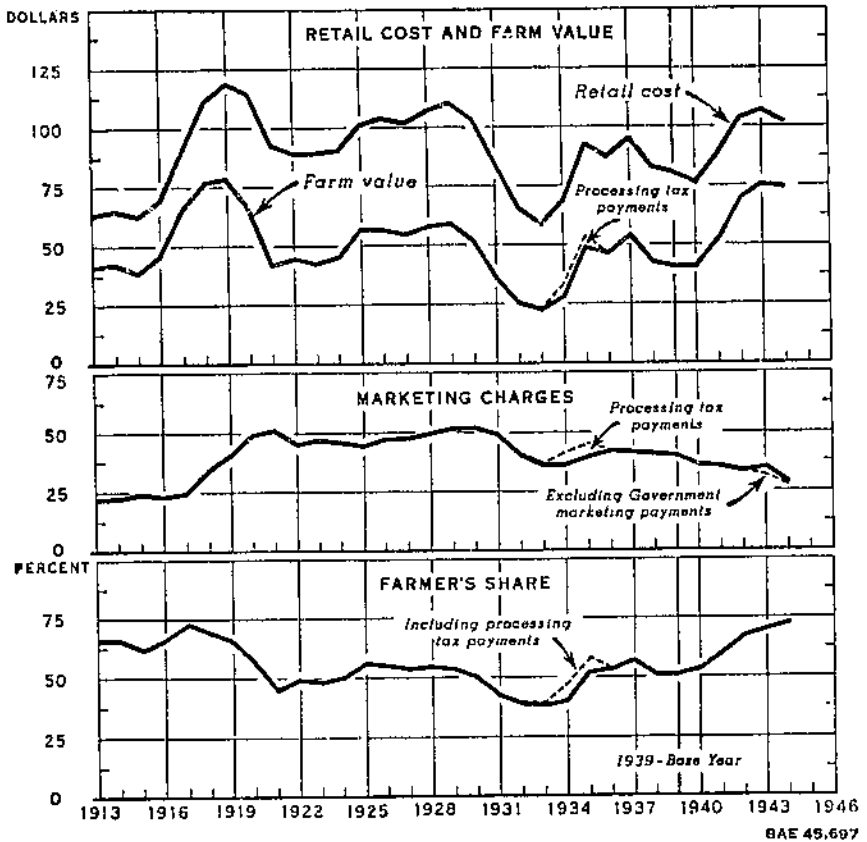


FIGURE 3.—RETAIL VALUE OF MEAT AND MEAT PRODUCTS PURCHASED BY FAMILY OF THREE AVERAGE CONSUMERS, FARM VALUE OF EQUIVALENT QUANTITIES OF LIVESTOCK SOLD BY PRODUCERS, MARKETING AND PROCESSING MARGIN, AND FARMERS' SHARE OF RETAIL VALUE, BY YEARS, 1913-44.

Expressed as percentage of the retail value of meat, marketing and processing charges were low, and returns to the farmer high when the price was high. When the price was low, the percentage of the retail value of meat represented by marketing and processing charges was generally high, and returns to the farmer were low. In 1939, the base year for this study, the spread between the retail value and the farm price was fairly normal.

Adapted from Miscellaneous Publication 576, United States Department of Agriculture, Price Spreads Between Farmers and Consumers For Food Products, 1913-44, p. 60.

retail value of meat, expressed in cents per pound, tends to be wide when prices are high and narrow when prices are low. The livestock producer tends to get not only lower prices per pound when the level of prices is low, but he generally also gets a smaller percentage share of the price consumers pay for meat. In the two depression periods, the early 1920's and the early 1930's, the percentage spread between the farm price of livestock and the retail price of meat was relatively high, and the farmer's share relatively low. On the other hand, during the

periods following these depressions, when prices were considerably higher, the percentage spread between farm and retail prices was smaller and the proportion received by farmers was relatively large.

This relationship has not been maintained during the war. The percentage of the retail value of meat shown as the marketing and processing margin has been smaller, and the percentage shown as the farmer's share larger than prevailed with the same price level for earlier years, even after making allowance for subsidies paid by the Government in 1943 and 1944.

If the reported retail price for the war period is too low, it may possibly be accounted for by the up-grading of meat, or by the processing of a larger-than-normal proportion of the meat which sold at higher prices, or by the sale of meat at prices above those reported. The reported farm value of livestock would be too high if farmers had paid more than the normal marketing services out of the prices received, but there is no indication that more than the customary services were paid for during the war. In 1939, the year used as base in this study, the total marketing and processing margin was 49 percent of retail value of the product, and the farmer's share 51 percent. This appears to have been about average over a longer period.

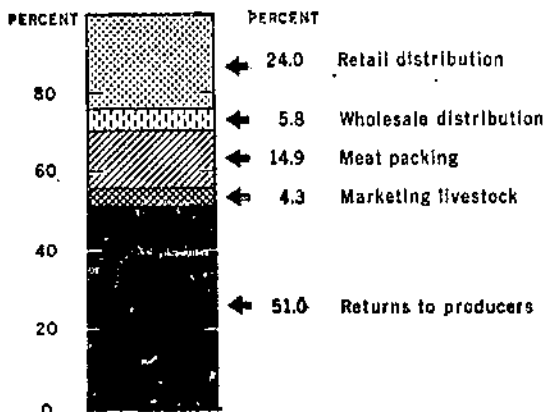
#### MARKETING AND PROCESSING MARGINS AND COSTS FOR 1939

The margin and costs for performing each of the broad functions of marketing and processing in 1939 are in this bulletin expressed both in cents per pound of meat (and lard) sold at retail, and in percentage of the retail value of meat. The total marketing and processing margin is the spread between the average retail value per pound of meat and the average price received by farmers for the number of pounds of livestock required on an average to produce 1 pound of meat, reduced by the estimated value of byproducts, most of which were inedible (26). Margins were determined on the basis of the agencies involved in marketing and processing. Margins are shown for all livestock combined, and for all meat combined, instead of by species. However, some reference is made to studies in which margins by species were determined for other periods.

#### DISTRIBUTION OF MARGIN ON BASIS OF FUNCTIONS

Of the amount paid for meat at retail in 1939, nearly one-half went as payment for marketing and processing livestock and meat, and slightly more than one-half was received by the producers of livestock (fig. 4). The cost of distributing the meat, including both wholesaling and retailing, was equal to nearly 30 percent of the amount paid by consumers. Nearly 15 percent of the total went as payment to meat packers for slaughtering and processing, and 4.3 percent for the marketing of livestock, including their transportation.

The average retail value of meat (including lard) in 1939 was 23.5 cents per pound (table 3) (26). The average margin for retailing was found to be 24.0 percent of the retail value, or 5.6 cents per pound (see page 76). According to this the wholesale value of meat was 17.9 cents per pound. The margin for wholesaling, which included outward trans-



BAE 45.698

FIGURE 4.—DISTRIBUTION OF CONSUMER'S DOLLAR FOR MEAT AND MEAT PRODUCTS, BASED ON MARKETING AND PROCESSING FUNCTIONS, 1939.

The combined margin for wholesaling and retailing meat was equal to about 30 percent of the retail value of the product. The margin for meat packing was about one-half as great. The cost of marketing livestock was small compared with the total. Returns to producers of livestock was slightly more than one-half of the amount paid by consumers for meat.

portation, was 7.7 percent of the value at wholesale, or 1.4 cents per pound (see page 66). The value of the meat at the plant was therefore 16.5 cents per pound. The margin for meat packing was found to be 21.4 percent of the value at plant, or 3.5 cents per pound (see page 47). This indicates that on a retail value basis the market value of the livestock was 13.0 cents per pound. The margin for livestock marketing, which included transportation, was 1.0 cent per pound (see page 19). In terms of the retail sales unit or composite average, the amount paid producers for livestock was equal to 12.0 cents per pound.

TABLE 3.—Margins in cents per pound and percentage of retail value for marketing livestock, meat packing, wholesaling and retailing meat, and returns to producers of livestock, based on retail value of all meats combined, 1939

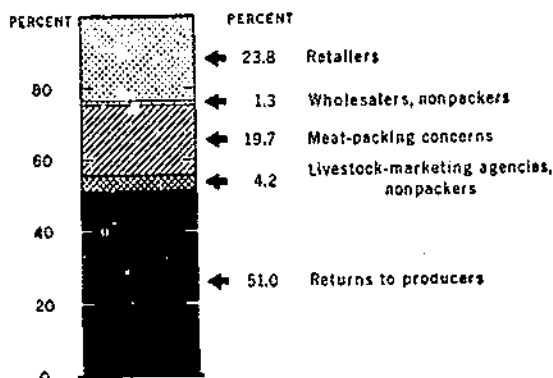
Item	Value per pound	Percentage of retail value
	Cents	Percent
Value at retail.....	23.5	100.0
Margin for retailing.....	5.6	24.0
Margin for wholesaling.....	1.4	5.8
Margin for meat packing.....	3.5	14.9
Margin for live-stock marketing.....	1.0	4.3
Received by producers for live-stock.....	12.0	51.0

#### DISTRIBUTION OF MARGIN ON BASIS OF AGENCIES

The distribution of the margin for meat and meat products was different in some respects when based on the agencies involved than on the functions performed because some agencies performed more than one function.

The proportion of the retail value of meat absorbed by the meat-packing concerns was considerably greater than that which went as payment for slaughtering and processing, the most important other function being the wholesale distribution of the product. This included sales through the wholesale departments at the plants, through the packer-owned branch houses, through wholesale offices where distribution was made by agents from refrigerator cars, by car routes, and by truck routes. In addition, some of the larger packing concerns operated concentration yards and buying stations where they procured livestock, but the volume of livestock bought at these markets is small in relation to the total volume handled at all livestock markets.

It is estimated that 19.7 percent of the total retail value of meat went to meat-packing concerns for performing the various functions of marketing, slaughtering, and processing livestock and meat in 1939 (fig. 5). This percentage is estimated to be made up as follows:



BAE 45,699

FIGURE 5.—DISTRIBUTION OF CONSUMER'S DOLLAR FOR MEAT AND MEAT PRODUCTS, BASED ON MARKETING AND PROCESSING AGENCIES, 1939.

In addition to slaughtering and processing, meat-packing concerns perform most of the wholesaling function, do a small amount of retailing, and operate a few livestock markets. The total returns to meat-packing concerns was nearly one-fifth of the value of meat sold at retail. The proportion received by the independent (non-packer) wholesalers was very small. Returns to producers of livestock were slightly more than one-half the amount paid by consumers for meat.

Meat packing, 14.9 percent; wholesaling, 4.5 percent; retailing, 0.2 percent; and operating livestock markets, 0.1 percent. The retail meat dealers' share of the consumer's dollar was 23.8 percent. Livestock marketing agencies (non-packer) received 4.2 percent of the amount paid by consumers for meat that year. The independent wholesalers' (non-packer) share was only 1.3 percent of the total paid by consumers for meat. Returns to producers was 51.0 percent of the total retail value.

Meat packing and retail distribution of meat were integrated only to a limited extent in 1939, but such integration apparently has been on the increase since then. The four largest national packing concerns are prohibited by the Packers' Consent Decree, in effect since 1920, from engaging in meat retailing. A few of the other meat-packing concerns operate retail establishments, either for meat alone or for meat and



groceries. During the war there was an increase in the meat packing-retailing combination on the part of several chain-food-retailing concerns which had acquired meat-packing plants, primarily for the purpose of supplying their own stores with meat. In addition, a large number of individuals and concerns operating small plants, of which there were a total of about 4,400 according to the War Food Administration, have sold meat at retail as well as at wholesale in recent years.

#### CHANGE IN MARGIN WITH CHANGE IN PRICES

For some functions of marketing the expenses per unit of product remain fairly constant irrespective of the price at which the product sells. For others, expenses tend to change directly with the change in price, but the degree of change may be proportionately less. This is indicated by the data in table 4 which show the average values and margins for the period 1925-28, when livestock and meat prices were relatively high, as well as the average values and margins for the period 1931-34, when prices were relatively low (24).

The expense per hundredweight for marketing livestock was about the same whether prices were high or low, or whether the volume marketed was small or large. This is because the fees and charges for the services performed at markets, and the rates charged for transporting the animals, are generally on a head or on a weight basis.

TABLE 4.—*Values and margins for marketing livestock, processing and distributing meats, based on retail values of all meats combined, for the 4-year periods, 1925-28 and 1931-34.*

Item	Value per pound		Percentage of retail value	
	4-year average 1925-28	4-year average 1931-34	4-year average 1925-28	4-year average 1931-34
	Cents	Cents	Percent	Percent
Value at retail.....	25.0	16.3	100.0	100.0
Margin for retailing function.....	5.6	4.9	22.4	30.1
Value at wholesale.....	19.4	11.4	77.6	69.9
Margin for wholesaling function.....	1.1	1.0	4.4	6.1
Value at plant.....	18.3	10.4	73.2	63.8
Margin for processing function.....	3.7	3.0	14.8	18.4
Market value of livestock..	14.6	7.4	58.4	45.4
Margin for livestock marketing function.....	.9	.9	3.6	5.5
Received by producers.....	13.7	6.5	54.8	39.9

Based on Tobin and Greer (24, table 2, p. 18).

The margins for both processing and retail distribution of the product, on the other hand, changed considerably with the change in prices. They tended to be high when prices were relatively high, and low when prices were relatively low. In the period 1925-28, when the average retail price of all meat was 25 cents per pound, the margin for processing was 3.7 cents per pound. In the period 1931-34, when the average price at retail was 16.3 cents per pound, the processing margin was 3.0 cents per pound (including a processing tax of 0.7 cent per pound paid on pork and lard) (24).<sup>5</sup>

<sup>5</sup> This includes a processing tax on pork and lard in 1934 of 2.8 cents per pound which will amount to an average of 0.7 cent per pound of pork and lard, or an average of 0.2 cent per pound for all meat during the 4-year period, 1931-34.

For retail distribution of meat, the margin in 1925-28 was 5.6 cents, and in 1931-34 was 4.9 cents. The margin per pound of meat for wholesale distribution changed little with the change in the value of meat, being 1.1 cents the first period and 1.0 cent the second period.

As prices tend to be high when supplies are small, it is probable that the wide margins are influenced more by the small supplies than by the high prices. When small supplies are handled in processing plants, in wholesale establishments, and in retail stores that were designed and organized to handle larger supplies, the relatively fixed expenses have to be spread over the smaller volume, and this increases the cost per unit of output. When the volume is small, also, the physical equipment and probably the labor are not fully utilized, so that the unit cost of their operations is increased. Other important factors affecting the processing and distribution margins are the scale of wages paid, efficiency of labor, the extent to which products are processed before they are sold, and the nature and amount of services furnished by processors and distributors of meat.

Margins for the various marketing functions and for processing, when expressed as percentages of the retail price of the product, tend to be high when the price is low, and low when the price is high. This results from the fact that the margin in cents per pound of a product either remains virtually unchanged, or changes less than the change in price of the product, so that when compared with low-price products the percentage margin is large and when compared with high-price products the percentage margin is small. In the study referred to above, the total margin for marketing and processing all meat combined averaged 45 percent of the retail value in the 4-year period 1925-28 when the average retail price of meat was 25.0 cents per pound. The total margin was 60 percent of the retail price in the period 1931-34 when the average retail price of meat was 16.3 cents per pound (24). The share received by producers of livestock was 55 percent of the amount paid for meat by consumers in 1925-28, and only 40 percent in 1931-34. The wide percentage margin that tends to be maintained when prices are low may in part be due to a lag in the adjustments of marketing costs as prices decline. It is not improbable that the margin would narrow if low prices were continued over a protracted period.

#### MARGIN NOT THE SAME FOR ALL SPECIES

Margins for marketing and processing are not the same for meat from the different species of livestock (table 5) (24). Expressed in cents per pound of meat sold at retail, the margin for marketing livestock was about the same for cattle (beef) and calves (veal), was slightly smaller for hogs (pork), but was approximately twice as great for sheep and lambs (mutton and lamb). Both marketing costs and transportation rates for sheep and lambs are relatively high, on account of the light weight of the animals, which means light loads. Transportation is high also, because of the relatively long distance between the points of production and the places of consumption.

The processing margins for beef and veal were smaller than for pork. In the case of pork, such cuts as hams, shoulders, and bellies are mostly

cured and smoked, involving considerable processing expense. Much of the bacon is sliced and packaged at the plant. Beef, on the other hand, is usually sold fresh, either as quarters or as carcasses, and only a small quantity is processed. Most of the veal is sold as carcasses with the skin on, and this keeps costs of dressing low. Only a small proportion of the veal is processed. Mutton and lamb are largely sold fresh, and in the form of carcasses or wholesale cuts. However, as the average weight of the individual sheep or lamb carcass is small, this accounts for relatively high cost per pound for slaughtering and handling at the plant.

TABLE 5.—Values and margins per pound of meat sold at retail, by kinds, and by the 4-year average periods, 1925-28 and 1931-34<sup>1</sup>

Item	Beef		Veal		Pork and lard		Mutton and lamb		All meats	
	1925-28	1931-34	1925-28	1931-34	1925-28	1931-34	1925-28	1931-34	1925-28	1931-34
Value at retail....	25.7	18.7	33.0	21.0	23.8	14.2	32.8	21.4	25.0	16.3
Margin for retailing function....	7.8	6.5	12.3	8.9	3.6	3.5	7.4	7.0	5.6	4.9
Value at wholesale	17.8	12.2	20.7	12.1	20.2	10.7	25.4	14.4	19.4	11.4
Margin for wholesaling function....	1.2	1.1	1.2	1.0	1.0	.9	1.1	1.0	1.1	1.0
Value at plant....	16.7	11.1	19.5	11.0	19.2	9.8	24.3	13.4	18.3	10.4
Margin for processing function....	2.9	2.6	2.2	1.8	4.3	3.5	4.4	2.6	3.7	3.0
Market value of livestock....	13.8	8.5	17.3	9.2	14.9	6.3	19.8	10.8	14.6	7.4
Margin for livestock marketing function....	.9	.9	.9	.9	.9	.8	1.6	1.6	.9	.9
Farm value of livestock....	12.9	7.6	16.4	8.3	14.0	5.5	18.2	9.2	13.7	6.5

<sup>1</sup> Edible products only: Does not include income from the sale of inedible byproducts, but the values shown for livestock are amounts proportionate to the values of the edible product.

<sup>2</sup> Includes processing taxes on pork and lard, amounting to 2.8 cents per pound for 1934, or an average of 7 cents for the 4-year period 1931-34.

<sup>3</sup> The processing tax on pork and lard will equal an average of 0.2 cents on all meats for the 4-year period.

Based on Tobin and Greer (24, pp. 16-27).

Wholesaling expenses were fairly uniform for meat of the different species. It was highest for pork because sales of pork are usually made as wholesale cuts instead of carcasses and quarters.

The cost per pound of retailing beef, and mutton and lamb, was about twice as high as for pork. The cost of retailing veal was still higher. For beef, veal, mutton and lamb considerable labor is required by the retailers in cutting and preparing steaks and roasts, and for grinding some of the beef cuts into hamburger. Cured pork to some extent is sold to consumers in wholesale cuts. Sliced bacon and carton lard packaged at the slaughtering plant require relatively little labor in handling at the retail store. More and better refrigeration also are needed for the fresh than for the cured products.

In a study made by the Federal Trade Commission for 1935, the relationships between the margins for marketing and processing beef, veal, and pork agreed fairly well with those shown in the study by Tobin and Greer (table 3) for some of the functions, but differed considerably for others (table 6) (35). As the data apply to different years it is not pos-

sible to make direct comparison between the findings in these studies, but it appears that the wholesale margins for beef and pork in the Commission study are unusually high. The margin for veal is about the same in the two studies.

TABLE 6.—Value and margins per 100 pounds of edible meat products of different kinds, 1935

Item	Amount per 100 pounds			Percentage of total		
	Beef	Veal and calf	Pork	Beef	Veal and calf	Pork
	Dollars	Dollars	Dollars	Percent	Percent	Percent
Consumers' average cost.....	27.02	23.64	25.64	100.0	100.0	100.0
Average retail margin.....	8.26	8.89	5.70	30.6	37.6	22.2
Average wholesale margin.....	3.14	1.43	3.25	11.6	6.0	12.7
Average margin for processing.....	3.58	2.99	4.71	13.3	12.7	18.4
Average proceeds to farmers.....	10.81	10.33	10.33	40.0	43.7	40.3
Transportation costs, etc. on live animals.....	1.23	(*)	1.65	4.5	(*)	6.4

\* Not given on account of apparent discrepancy between the data used. Based on United States Federal Trade Commission (35, pp. 175-116).

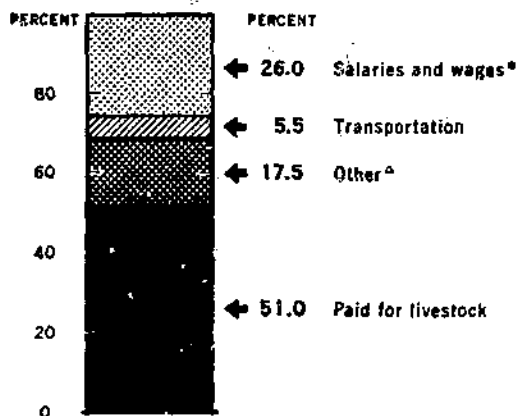
#### ITEMS OF COST COMPRISING MARGIN

In 1939, payment for salaries and wages for performing all of the various functions of marketing livestock and meat, and for slaughtering and processing, amounted to 26.0 percent of the retail value of meat<sup>6</sup> (fig. 6). Transportation was equal to 5.5 percent of the retail value of meat, of which 2.6 percent was for transporting livestock and 2.9 percent for transporting meat. All other expenses such as supplies, containers, taxes, depreciation, interest, etc., and profits were 17.5 percent of the retail value of the product. As pointed out earlier, the amount paid for livestock was equal to 51 percent of the total retail value of meat.

The transportation expense was equal to \$1.62 per hundredweight of meat sold at retail. Transportation of livestock was \$0.61 per hundredweight on retail basis (equal to \$0.35 per hundredweight live weight basis), and transportation of wholesale meat \$1.01 per hundredweight retail basis (equal to \$0.91 per hundredweight wholesale basis).

Of the total operating expenses for performing the various marketing and processing functions for livestock and meats in 1939, payments for salaries and wages were equal to 53 percent. Transportation amounted to 11 percent, and all other operating expenses and profits combined amounted to 36 percent. The proportion of the operating expenses paid out for salaries and wages was not the same for performing the different functions. For marketing livestock (exclusive of transportation), 49 percent of the operating expenses was paid labor. For meat packing, salary and wage payments amounted to 51 percent of the total operating expenses, for wholesaling 52 percent (exclusive of transportation), and for retailing 58 percent.

<sup>6</sup> This is confined to salaries and wages paid directly by the marketing and processing agencies. It does not include salaries and wages paid for production of the livestock, supplies, equipment and materials used, or for transporting livestock and meat.



\* EXCLUSIVE OF SALARIES AND WAGES PAID FOR TRANSPORTING LIVESTOCK AND MEAT  
<sup>Δ</sup> INCLUDES SUPPLIES, CONTAINERS, TAXES, DEPRECIATION, INTEREST, ETC., AND PROFIT

BAE 45,700

FIGURE 6.—DISTRIBUTION OF CONSUMER'S DOLLAR FOR MEAT AND MEAT PRODUCTS, BY COST ITEMS, 1939

Payment for salaries and wages for marketing and processing livestock and meat was equal to more than one-fourth of the amount paid by consumers for meat, or more than one-half of all marketing and processing expenses. The cost of transporting livestock and meat was slightly in excess of 5 percent of the retail value of meat. All other expenses and profits in connection with marketing and processing was 17.5 percent of the retail value of meat. Returns to producers of livestock was slightly more than one-half the amount paid by consumers for meat.

### MARGIN AND COSTS FOR MARKETING LIVESTOCK

The share of the consumer's dollar for meat that goes as payment for marketing livestock varies with the channels of marketing and with the markets used. Expenses at some markets are considerably higher than at others, depending largely on the services rendered. A producer who sells his own livestock at a packing plant where it is slaughtered, and who furnishes his own transportation, makes no payment to others for performing the marketing services. If sale is made at a public market, fees and charges are paid for yardage, commission for selling, and probably for feed. If a hired trucker calls for the livestock at the farm and delivers it to market, or to a local loading point from where it is shipped by rail, transportation is paid for. In many cases, markets are used where some services are delegated and paid for, and some are performed by the producer of livestock.

Several factors are taken into consideration by producers when choosing markets at which to sell. If the choice is based on expected net returns from selling at alternative markets, the factors generally taken into account are: The price received for the animals per hundredweight, selling and handling expenses at the market, cost of transportation, and estimated shrinkage and death losses up to the time of sale. But factors other than estimated net returns sometimes may influence the seller of

livestock, such as prejudice in favor of one type of market and against another, being assured a certain price before the animals leave the farm instead of taking risk of possible price changes, convenience, and custom.

#### AVERAGE COST OF MARKETING LIVESTOCK

The average margin or cost of marketing the livestock sold in 1939 is estimated to have been \$0.57 per hundredweight alive, which is equal to \$1.02 per hundredweight of meat sold at retail (table 7). Of the cost on retail-meat basis, \$0.41 per hundredweight was expenses for selling and handling livestock at markets, and \$0.61 per hundredweight for transportation. The expenses applied to the livestock sold at all types of markets. For the livestock that moved through more than one market, the expenses involved at each of the various markets used were included. An estimated marketing expense was also added for the livestock that passed through more than one market of the same type. For sales made direct to packers no allowance was made to compensate the farmer for the time he devoted to marketing. The expenses of marketing stocker and feeder animals that moved direct from the range or farm to a feedlot or to some other farm were estimated in the same way as for slaughter livestock. Losses resulting from shrinkage of tissue, and from bruising, death, and crippling of animals in transit or during other stages of marketing were not included.

TABLE 7.—Marketing and transportation expenses for livestock per hundredweight, 1939<sup>1</sup>

Item	Cattle		Calves		Hogs		Sheep and lambs		All livestock	
	Live weight	Meat sold at retail weight	Live weight	Meat sold at retail weight	Live weight	Meat sold at retail weight	Live weight	Meat sold at retail weight	Live weight	Meat sold at retail weight
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Marketing.....	0.20	0.43	0.24	0.52	0.19	0.27	0.28	0.60	0.22	0.41
Transportation..	.33	.70	.45	.61	.33	.45	.42	.90	.35	.61
Total.....	.53	1.13	.69	1.13	.52	.72	.70	1.50	.57	1.02

<sup>1</sup> Losses resulting from shrinkage of tissue, bruising, death, and crippling of animals are not included in the cost of marketing livestock.

For all livestock sold in 1939, the average cost of marketing per hundredweight alive, including transportation, was 53 cents for cattle, 69 cents for calves, 52 cents for hogs, and 70 cents for sheep and lambs. Expressed in terms of 100 pounds of meat sold at retail, the cost of marketing averaged \$1.13 for cattle and calves, \$0.72 for hogs, and \$1.50 for sheep and lambs.

The cost of marketing livestock depended both on the type of market used and on the distance transported (table 8). Marketing expenses were naturally increased for the livestock that passed through more than one market between the farm and final destination. On the other hand, for the livestock marketed by farmers direct to packers, or to others as in the case of feeder animals or breeding stock, no costs were included

TABLE 8.—Expenses per 100 pounds of marketing livestock at various types of markets, 1939<sup>1</sup>

Markets and agencies	Cattle			Calves			Hogs			Sheep and lambs			All livestock combined		
	Pro- portion marketed <sup>2</sup>	Rate per 100 pounds		Pro- portion marketed <sup>2</sup>	Rate per 100 pounds		Pro- portion marketed <sup>2</sup>	Rate per 100 pounds		Pro- portion marketed <sup>2</sup>	Rate per 100 pounds		Pro- portion marketed <sup>2</sup>	Rate per 100 pounds	
		Live weight	Sold at retail <sup>3</sup>		Live weight	Sold at retail <sup>3</sup>		Live weight	Sold at retail <sup>3</sup>		Live weight	Sold at retail <sup>3</sup>		Live weight	Sold at retail <sup>3</sup>
Percent	Dollars	Dollars	Percent	Dollars	Dollars	Percent	Dollars	Dollars	Percent	Dollars	Dollars	Percent	Dollars	Dollars	
Dealers.....	20	0.15	0.32	20	0.15	0.32	16	0.15	0.21	13	0.15	0.32	19	0.15	0.28
Local cooperative asso- ciations.....	4	.15	.32	4	.15	.32	15	.15	.21	4	.15	.32	8	.15	.24
Concentration yards.....	5	.11	.24	5	.11	.24	16	.11	.16	8	.11	.24	10	.11	.19
Auctions.....	13	.22	.48	13	.26	.56	7	.22	.31	11	.31	.67	11	.22	.46
Public markets.....	53	.20	.43	43	.34	.73	43	.24	.34	51	.39	.84	52	.23	.45
Direct to packers and others.....	23	-----	-----	23	-----	-----	25	-----	-----	24	-----	-----	24	-----	-----
Weighted average.....	-----	.18	.39	-----	.22	.48	-----	.18	.25	-----	.27	.58	-----	.20	.38
Adjusted average <sup>4</sup> .....	-----	.20	.43	-----	.24	.52	-----	.19	.27	-----	.28	.60	-----	.22	.41
Transportation.....	-----	.33	.70	-----	.45	.61	-----	.33	.45	-----	.42	.90	-----	.35	.61
Total.....	-----	.53	1.13	-----	.69	1.13	-----	.52	.72	-----	.70	1.50	-----	.57	1.02

<sup>1</sup> Losses resulting from shrinkage of tissue, bruising, death, and crippling of animals in transit or at markets may logically be considered marketing costs but owing to lack of adequate data they are not so considered in this study in determining cost of marketing livestock.

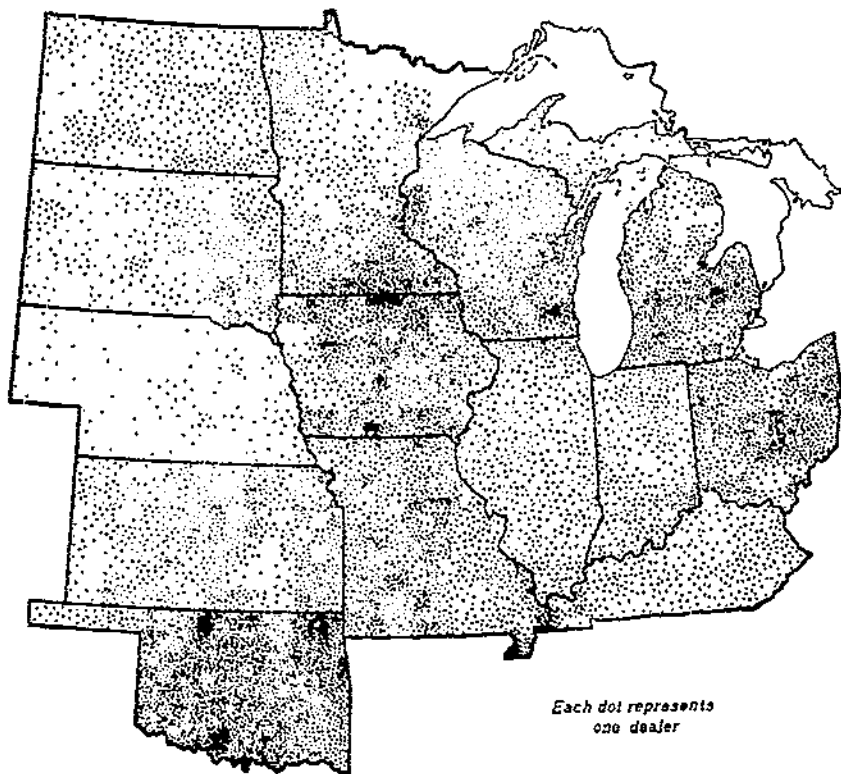
<sup>2</sup> Proportions marketed by farmers in the Corn Belt in 1940. Total percentage exceeds 100 because some livestock was sold through more than one type of market.

<sup>3</sup> Expenses per 100 pounds of meat sold at retail was derived from the expenses per 100 pounds live animal. The number of pounds of meat sold at retail per 100 pounds live weight, used as conversion factors, were: Cattle, calves, and sheep and lambs, 46.3 pounds; and hogs, 70.9 pounds.

<sup>4</sup> Adjusted to allow for an estimated duplication in marketing at markets of same type.

because payments were not made for these services. About one-fourth of the livestock marketed that year moved direct and therefore did not pass through any market. As transportation is an important function in marketing, its cost has been included for all of the livestock sold, irrespective of the market outlet used.

The data for proportions of the different species of livestock that moved through each type of market in the Corn Belt in 1940 were used in determining the average cost of marketing, as corresponding information is not available for the country as a whole. The average cost per hundredweight for marketing (exclusive of transportation) was determined by weighting the cost at each type of market by the proportion that moved through markets of that type. But this did not take into account duplication of sales of animals moving through more than one market of the same type. In the absence of specific information on market duplication, estimated adjustments were made in the weighted-



DAE 42,509

FIGURE 7.—LOCATION OF LIVESTOCK DEALERS IN 14 STATES IN THE CORN BELT REGION, 1941

A large portion of the dealers operated motortrucks and assembled livestock from farms. Some maintained yards at local shipping points to which the livestock was delivered by farmers.

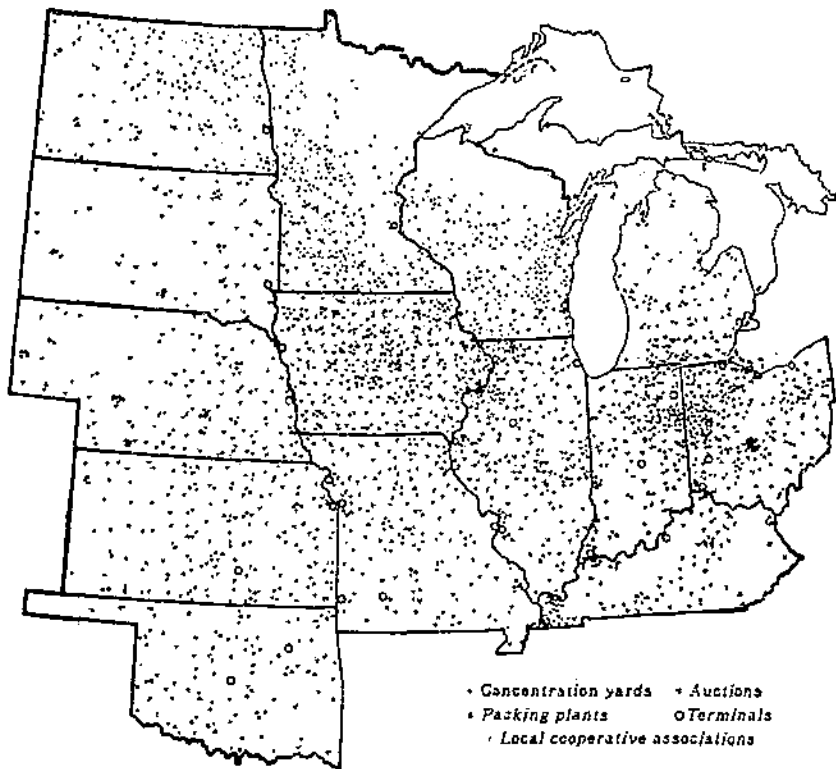
Data adapted from reports of Corn Belt Livestock Marketing Research Committee.



average prices. The average cost of marketing cattle and calves per hundredweight alive was increased by 2 cents, and hogs, and sheep and lambs by 1 cent. Cattle and calves are being traded in by speculators to a greater extent than hogs, and sheep and lambs, which accounts for the greater market duplication.

#### COST OF MARKETING LIVESTOCK AT DIFFERENT TYPES OF MARKETS

The margins and costs of selling livestock at or through different types of markets in order to be fully significant need to be related to the services performed at the markets. Some types of markets are primarily for local assembly, some are intermediate or concentration markets, and others are terminal markets. At some markets, livestock is



DAE 42,500

FIGURE 8.--LOCATION OF LOCAL COOPERATIVE ASSOCIATIONS, CONCENTRATION YARDS, AUCTIONS, TERMINAL PUBLIC MARKETS, AND PACKING PLANTS, IN 11 STATES IN THE CORN BELT REGION, 1941

A large proportion of the farmers in the region were so situated that they could sell livestock to one of several markets, including markets of different types, as shown in figures 7 and 8.

Data adapted from reports of Corn Belt Livestock Marketing Research Committee

bought outright. At others, services are provided to care for and to sell the livestock for which the owners pay fees and commissions.

An indication of the number of markets available for handling livestock may be had from a comprehensive study made in the Corn Belt region in 1940 (6). In the 14 States included in that study, were 12,296 livestock dealers or truck buyers (fig. 7), 998 local cooperative associations, 319 concentration yards or local markets, 1,077 auctions or sale barns, 26 terminal public markets, and 589 packing plants, of which 273 were located at the terminal public markets and 316 at interior points (fig. 8). Operating at the terminal public markets were 1,387 commission men, order buyers, and dealers. The 2,916 retail meat dealers in the region did some slaughtering.

Information on the number of markets of different types located in the States outside the Corn Belt is considerably less complete. A study by the Bureau of Agricultural Economics showed that in 1937 about 300 auctions were located outside this region. This number probably had increased to between 400 and 500 by 1941, bringing the total for the entire country to 1,400 or 1,500 auctions. Local cooperative associations outside the Corn Belt probably number less than 150. Both the number of concentration yards or local markets, and the number of terminal public markets are small. Livestock dealers apparently are numerous in all parts of the country but reliable information of the number is not available.

#### COSTS AND SERVICES AT LOCAL ASSEMBLY MARKETS

Local cooperative associations and livestock dealers perform primarily the function of local assembly, but their methods of operation differ. Cooperative associations handle livestock for their members, but they do not all perform the same services. Some associations sell livestock at markets or at packing plants, wherever the highest net return is expected. Others sell all of the livestock to the same buyer. Local dealers buy livestock outright. Both local cooperative associations and dealers may maintain their own yards and other market facilities to which the livestock is delivered, they may use railroad yards, or they may operate motortrucks and take delivery of the livestock at the farm.

The sale of livestock in small lots by farmers is relatively common, and a significant function of local assembly markets is to consolidate these lots into truck loads or carloads. In the Corn Belt in 1940, 6 percent of the cattle was sold as single animals, and about one-fifth of the number was sold in lots of 1, 2, or 3 head (6). With calves, 43 percent was sold as single animals, and 87 percent in lots of from 1 to 3 head each. Sales in lots of from 1 to 10 head comprised about 22 percent of the hogs, and 11 percent of the sheep and lambs.

The assembly of livestock at local yards has been reduced by both dealers and local cooperative associations in recent years. A large proportion of the local dealers now operate motortrucks and pick up at farms much of the livestock they buy from farmers. Of the livestock which dealers obtained from farmers in the Corn Belt region in 1940, 23 percent of the cattle, 32 percent of the calves, 42 percent of the hogs, and 35 percent of the sheep and lambs were delivered to their place of

business by farmers or by custom truckers. The rest were picked up at farms by dealers who operated motortruckers.

The volume of livestock handled by local cooperative associations is relatively small, being only 4 percent of the cattle and calves, 5 percent of the hogs, and 4 percent of the sheep and lambs sold by farmers in the Corn Belt in 1940. Of the livestock handled by associations in this region in 1940, the volume delivered to their yards by farmers or custom truckers, and that picked up at farms in association trucks and delivered to their yards, comprised 68 percent of the cattle, 73 percent of the calves, 71 percent of the hogs, and 66 percent of the sheep and lambs. The rest were delivered directly from the farm to the buyer without being assembled locally.

Information on the cost of assembling livestock locally is meager. An examination of annual reports of several local cooperative associations indicates that their cost was about 15 cents per hundredweight in 1939. This cost was higher than that shown by studies during the period 1915 to 1933 which averaged from 8 cents to 10 cents per hundredweight (25). The cost of handling livestock by dealers is not available and is therefore assumed to be about the same as for local cooperative associations.

#### COSTS AND SERVICES AT CONCENTRATION YARDS

Concentration yards are private stockyards where livestock is assembled in relatively large numbers for reshipment. Most of the yards are owned by the larger packing concerns which use them for concentrating livestock for shipment to their plants located elsewhere. Some are privately owned, and a few are operated by cooperative associations and by railroads. At both the packer-owned and at the privately-owned yards, the livestock is purchased outright. The cooperative concentration yards either sell the livestock direct to packers or consign it to public markets.

Although concentration yards were established primarily for the rail shipment of hogs, they now handle other species of livestock as well (8). Yards were usually located in areas of large hog production, and at points having adequate railroad facilities. Many of the yards were built by railroads, but they have since been sold or leased to those who operate them. Hogs originating at other points on the railroad were shipped to concentration yards, and were unloaded, sorted, weighed, double-decked, mixed, and forwarded on the original billing to destination. In this way, shippers were able to take advantage of lower through rates. The through-rate privilege has become of minor importance more recently because much of the livestock is now received at these yards by motortruck.

The cost of operating concentration yards is estimated to have been about 11 cents per hundredweight in 1939. This estimate is arrived at by making adjustments in the cost of operation during the period 1931-33, as shown by a study made by the Bureau of Agricultural Economics (25). The average operating cost in 1931 for 13 concentration yards was 8.7 cents per 100 pounds live weight. In 1932, for 20 yards, it was 8.6 cents per 100 pounds, and in 1933, for 22 yards, it was 6.3 cents.

These costs did not include transportation of the hogs to the concentration yards or from the yards to the packing plants; losses sustained of dead and crippled hogs; shrinkage; and driving, yarding, and handling the livestock at destination. This was a period of depression when some operating costs, especially those for labor, were relatively low. In 1939, a larger proportion of livestock was transported by motortruck as compared with rail than during the earlier period, and this probably increased operating costs because many of the lots received were small.

Considerable variation was found in the cost of operating different concentration yards during the same year. In 1931, the cost per hundredweight for individual yards varied from 5.4 to 14.5 cents. Comparable variations were found for 1932 and 1933. The variations were influenced by the volume of business, wages, salaries, feed, and other items of cost. The lower costs recorded in 1933 as compared with the other 2 years is accounted for by the larger volume of hogs handled at some of the yards, and by a general reduction in operating expenses.

The cost of operating concentration yards per hundredweight decreased as the volume of hogs handled increased (table 9). As some overhead costs were relatively fixed for a given yard, irrespective of the volume handled, increasing the volume of hogs reduced the overhead per hog or per hundredweight.

TABLE 9.—Average cost of operating concentration yards, classified by volume of hogs handled, 1931-33

Year	50,000 head and less per year	50,001 to 100,000 head per year	Over 100,000 head per year
	Cents per head	Cents per head	Cents per head
1931 .....	29.0	19.8	17.6
1932 .....	30.0	22.1	14.9
1933 .....	17.1	15.3	13.9

United States Bureau of Agricultural Economics (25, table 41, p. 189).

#### COSTS AND SERVICES AT AUCTIONS

Auctions are places where livestock is assembled at regular intervals and sold by the auction method to the highest bidder. The auction company furnishes the services of an auctioneer who does the selling, and cares for and shelters the animals. Many auctions serve mainly as clearing houses for locally produced animals that are bought for purposes other than immediate slaughter. Some, however, handle substantial volumes of slaughter livestock, and others are important markets for feeder cattle and feeder lambs. The consignor pays a fee or commission to the auction company which generally covers all of the services of selling and handling the livestock, and yardage. At some auctions a separate charge is made for yardage. Feeding is customarily confined to livestock received before the day of sale. When feed is used it is paid for by the consignor.

At most auctions, the individual consignor's animals are generally sold separately; sales in small lots, therefore, are common. At auctions where large volumes of lambs, veal calves, and slaughter hogs are sold, the animals are ordinarily sorted into lots of uniform grade and weight,

usually equal to a deck on a railroad stock car. Packers always buy at these auctions, and they also buy at some auctions where sales are made by single animals or by small lots.

The average expense for selling livestock per hundredweight at auctions in 1939 is estimated on the basis of studies of auction marketing to have been 22 cents for cattle, 26 cents for calves, 22 cents for hogs and 31 cents for sheep and lambs (10, 20, 23). This covered the expenses at the markets but did not include transportation to or from the auctions. The rates charged for selling and the method of computing charges vary among auctions. Some operators base charges on a percentage of gross sales, some charge on a per-head basis, and some use a combination of these methods.

Charging a percentage of gross sales was the basis used at 44 of the 48 auctions studied in Iowa in 1937 (25), and at 31 of the 36 auctions studied in Minnesota in 1939 (10). At the other auctions included in these studies stipulated amounts per head were charged. The Farm Credit Administration cooperating with 14 agricultural experiment stations in a study of 176 auctions located in different parts of the country in 1937 found that charges based on percentage of gross sales were made at 51 percent of the auctions, on a per-head basis at 44 percent, and on a combination of these methods at the other 5 percent of the auctions (20). At some auctions, the charges were the same, irrespective of the volume of livestock furnished by a consignor. In other cases, the rates were reduced as the gross value, or the number of head, increased.

The most common rate of commission based on the gross value of the livestock was 3 percent, but rates varied among auctions from 2½ percent to 5 percent. The most common rate per head for cattle was \$1, but ranged from about 50 cents to \$1.25. The most customary charge per head for calves was 50 cents per head, with a range of from 30 cents to \$1, and the most common charge per head for pigs was 25 cents, for hogs 50 cents, and for sheep 25 cents. If livestock was fed at the auction, the consignor paid for the feed. In States where it was required that qualified veterinarians inspect the animals for disease before they were sold, charges of a few cents per head were made to cover this expense. Miscellaneous charges for insurance, vaccination of hogs, and dipping of sheep were made at many of the auctions, if such services were rendered, but fees were small.

#### COSTS AND SERVICES AT TERMINAL PUBLIC MARKETS

Livestock sold at terminal public markets is generally consigned to commission agencies that do the selling, receive payment from the buyers, and remit to the owners of the livestock after deducting for marketing expenses and transportation. A commission is paid for this work. The stockyards company undertakes to yard, feed, and care for the animals, and deliver them to the buyer, and for this the consignor pays a fee. Feeding is common, and the shipper pays for the feed. In addition, small charges are made for such miscellaneous services as inspection, insurance, and switching fees for rail shipments.

Commission rates are on a per-head basis, and vary with the size of the consignment, being higher per head for small lots than for larger

lots. Yardage charges often are higher for livestock received by motor-truck than by rail. Feed cost varies among markets. The cost of feeding varies among consignments at the same market because the quantity of feed ordered differs. Some livestock is sold without being fed.

The average expenses per hundredweight for marketing livestock at public markets in 1939, based on earlier studies, were estimated to have been 20 cents for cattle, 34 cents for calves, 24 cents for hogs, and 39 cents for sheep and lambs (13, 15, 23, 25). In the case of cattle, the expenses for commission and yardage average about 15 cents per hundredweight, the cost of feed 4 to 5 cents, and miscellaneous charges 1 cent or less. The relationships of these costs are fairly comparable for the other species of livestock. The costs estimated for 1939 were higher than those reported in some of the earlier studies as adjustments were made to take account of a general advance in some of the cost factors.

The average cost per hundredweight of marketing hogs at the Omaha terminal public market for the period 1930-35 shows the relative importance of the different expense items involved (table 10) (15). There was an increase in commission charges during the period, and this was associated with the increase in the use of motortrucks, according to the report. Livestock delivered by motortruck is in smaller lots, on an average, than those delivered by rail, and this involves higher commissions per hundredweight. The cost of feed often varies from one period to another.

TABLE 10.—Average cost per hundredweight of marketing Nebraska hogs through the Omaha terminal public market, 1930-35

Year	Commission	Yardage	Feed in yard	Inspection	Insurance	Other	Total
	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>	<i>Cents</i>
1930 .....	9.3	5.0	5.6	0.1	0.7	0.4	21
1931 .....	9.3	5.1	4.3	.2	.7	.5	20
1932 .....	10.2	5.5	3.0	.2	.6	.4	20
1933 .....	10.6	5.4	2.2	.2	.5	.3	19
1934 .....	12.0	5.9	3.1	.3	1.0	.3	23
1935 .....	12.2	5.7	4.3	.3	1.1	.3	24
Average.	10.1	5.3	4.2	.2	.7	.4	21

Lambrecht and Garey (15, table 5, p. 10).

A comparison of the cost of selling hogs in large lots (10 head and over) with the cost of selling in small lots (1 to 9 head) was made at the Cincinnati market for 1939 (table 11) (13). Exclusive of the cost of feed, the selling expense for the large lots was 22.4 cents per hundredweight, and for small lots 25.6 cents. Comparable relationships also generally applied to other species of livestock.

For the stockyards companies subject to the Packers and Stockyards Act, data on distribution of their expenses are available for the period 1927-37 (table 12).<sup>7</sup> Expenses were classified as salaries and wages, cost of sale (feed), depreciation, taxes (excluding Federal income taxes), and miscellaneous operating expenses. The stockyards companies continue to report annually but summaries of expenses have not been prepared since 1937. Salaries and wages comprised from 30 to 47 percent

<sup>7</sup> Published in annual reports of the Chief of the Bureau of Animal Industry, United States Department of Agriculture, 1927-37.

TABLE 11.—The total cost, cost per hundred, and percentage of total cost of marketing large and small lots of hogs at Cincinnati in 1939

Expenses <sup>1</sup>	Total cost		Cost per hundred dollars		Percent of total cost	
	Large lots <sup>2</sup>	Small lots <sup>3</sup>	Large lots	Small lots	Large lots	Small lots
	Dollars	Dollars	Dollars	Dollars	Percent	Percent
Commission .....	113.15	60.35	0.1466	0.1774	65.39	69.32
Yardage .....	57.60	23.33	.0746	.0746	33.27	29.15
Fire insurance .....	.96	.65	.0012	.0019	.54	.74
National Livestock and Meat Board .....	1.40	.69	.0018	.0020	.80	.79
Total .....	173.11	86.94	.2242	.2559	100.00	100.00
Size of sample .....	384	169	.....	.....	.....	.....
Weight .....	77,184	33,969	.....	.....	.....	.....
Average .....	201	201	.....	.....	.....	.....

<sup>1</sup> Cost of feed not included.<sup>2</sup> Large lots, 10 head and over.<sup>3</sup> Small lots, under 10 head.

Henning and Poling (13, table 12, p. 41).

of the total expenses of the stockyards companies reporting. For the 3-year period 1935-37, salaries and wages comprised 32.7 percent of the expenses. The cost of the feed sold amounted to 23.5 percent of the expenses; depreciation and taxes (excluding Federal income taxes) reached 9.9 percent, and miscellaneous operating expenses 33.9 percent.

TABLE 12.—Percentage distribution of expenses of stockyards companies subject to the Packers and Stockyards Act, 1927-37<sup>1</sup>

Year	Companies	Salaries and wages		Cost of sales (feed)	Depreciation	Taxes (excluding Federal income)	Miscellaneous operating expenses	Total
		Number	Percent					
1927 .....	69	32.5	33.8	4.9	5.8	23.0	100.0	
1928 .....	67	38.0	42.5	5.4	6.5	7.6	100.0	
1929 .....	69	38.8	40.9	5.4	7.0	7.9	100.0	
1930 .....	70	38.9	37.0	5.4	7.2	11.5	100.0	
1931 .....	67	42.6	32.6	4.4	7.7	12.7	100.0	
1932 .....	80	46.0	23.7	5.2	8.5	14.6	100.0	
1933 .....	82	47.1	21.9	5.1	7.7	18.2	100.0	
1934 .....	92	41.6	26.7	4.8	5.7	21.2	100.0	
1935 .....	96	32.3	23.1	3.8	6.1	34.7	100.0	
1936 .....	104	35.9	25.1	4.3	6.2	28.5	100.0	
1937 .....	127	30.0	22.4	3.8	5.4	38.4	100.0	

<sup>1</sup> Comparable data not available after 1937.

Based on data published in annual reports of the Chiefs of the Bureau of Animal Industry, United States Department of Agriculture.

### COST OF TRANSPORTING LIVESTOCK TO MARKET

In 1939, the average transportation expense for all livestock marketed was estimated at 35 cents per 100 pounds live weight, which would equal 61 cents per 100 pounds of meat sold at retail. Transportation, therefore, comprised about 60 percent of the estimated cost of marketing livestock.

Practically all livestock is transported from the farm by motortruck, only a small proportion being moved by wagon or on foot. Most of the livestock shipped to market by rail is delivered to the local shipping point by motortruck.

Transportation from the farm to the slaughtering plant or other final destination may be in a single stage, or in two or more stages. The

number of stages involved is mainly dependent upon the number of markets through which the livestock passes, and on where the livestock is moved after it is sold at the market. When slaughter livestock is bought at a market by a packer who is located elsewhere, the shipment from the market to the plant becomes another stage. This is likewise the case when a lot of stocker and feeder livestock is shipped from a market to a pasture or feedlot. In the case of some shipments by rail, transportation is continued from the market to final destination on the original billing, in which case the entire movement may be counted as a single movement for statistical purposes.

#### NATURE OF TRANSPORTATION SERVICES

Livestock is moved from farm to market by several means. Of all livestock sold by farmers in the Corn Belt in 1940, 20 percent (in carlot equivalents) was transported in the farmers' own motortrucks, 63 percent was hauled by hired truckers, 15 percent by buyers who took possession at the farm, and 2 percent by other means (mostly on foot) (7). The transportation furnished by hired truckers is generally paid for directly by farmers. When the farmer delivers his livestock, either in his own motortruck or by other means, the cost of transportation is more difficult to determine. To estimate the cost to the farmer of livestock transported by the buyer who takes possession at the farm is likewise difficult. Those who buy livestock at the farm presumably take into account the cost of transportation in arriving at the price they offer.

The extent to which motortruck and rail transportation are used for delivering livestock to markets of different types varies. There are variations also in the extent to which these means are used for transporting livestock from the markets. In the Corn Belt in 1940, all of the livestock received at yards of local cooperative associations were delivered by motortruck (table 13) (6). Motortrucks were used also for delivering

TABLE 13.—Approximate percentage of all livestock combined, on basis of carlot equivalents, transported to and from markets of various types in the Corn Belt region, 1940<sup>1</sup>

Types of markets	Transported to assembly points or markets		Transported from assembly points or markets	
	Truck	Rail	Truck	Rail
	Percent	Percent	Percent	Percent
Local cooperative associations.....	100	0	48	52
Dealers.....	95	5	75	25
Concentration yards or local markets.....	92	8	26	74
Auctions.....	92	8	87	13
Packing plants, direct.....	87	13	( <sup>2</sup> )	( <sup>2</sup> )
Terminal public markets.....	72	28	31	69

<sup>1</sup> Data for local cooperative associations, dealers, concentration yards or local markets, auctions, and packing plants where purchases are made direct are from Marketing Livestock in the Corn Belt Region by Corn Belt Livestock Marketing Research Committee, S. Dak. Agr. Expt. Sta. Bul. 365, tables 53, 54, 57, and 59-62. Data on receipts at terminal public markets are from Driven-In Receipts of Livestock, 1942, U. S. Food Distribution Administration, February 1943; and on shipments from these markets from Marketing and Transportation Situation, Bureau of Agricultural Economics, May 1944.

<sup>2</sup> In converting number of head to carlot equivalents the following factors were used: Cattle, 32; calves, 51; hogs, 90; and sheep and lambs, 220. These factors represent for each species the estimated average number of head shipped per rail stock car (combined single-decks and double-decks) in the United States in 1940.

<sup>3</sup> Not transported from packing plants.

From Corn Belt Livestock Marketing Research Committee (8, pp. 8-9).



more than 90 percent of the livestock received at yards of dealers, at concentration yards or local markets, and at auctions. Slightly smaller proportions of the livestock bought direct at packing plants were delivered by motortruck. At the terminal public markets motortruck receipts comprised 72 percent of the total. Smaller proportions of the sheep and lambs than of other species of livestock were delivered by motortruck. The extent to which motortruck and rail transportation were used varied both among States and among individual markets of the same type. In general, the proportion of the livestock transported by motortruck tended to decrease as the distance involved increased.

Motortrucks were used for transporting 48 percent of the livestock from assembly points of local cooperative associations, 75 percent from yards of dealers, and 87 percent from auctions to final destination. For shipments out of terminal public markets, motortruck transportation was used for 31 percent of the livestock that year, the other 69 percent being transported by rail.<sup>8</sup>

The distances from which livestock is moved to markets of different types varies considerably. In the Corn Belt in 1940, local cooperative associations received livestock from an average distance of 9 miles, dealers 31 miles, concentration yards or local markets 49 miles, and auctions 40 miles, (table 14) (7). Packers who bought direct received livestock from an average distance of 79 miles. Part of the livestock received at these markets came from farms and part from other markets or marketing agencies. Apparently, considerable numbers of cattle and sheep received from distances greater than 100 miles by dealers, at auctions, and at packing plants, came from western ranges, and from terminal public markets.

TABLE 14.—Approximate average distances from which livestock was received at various types of markets and agencies in the region, by species and combined, 1940<sup>1</sup>

Markets and agencies	Cattle	Calves	Hogs	Sheep and lambs	All livestock combined
	Miles	Miles	Miles	Miles	Miles
Local cooperative associations.....	9	9	9	101	49
Dealers .....	35	24	16	60	11
Concentration yards or local markets..	46	29	50	38	40
Auctions .....	48	33	28	9	79
To packers direct.....	80	73	77	115	31

<sup>1</sup> Based on Corn Belt Livestock Marketing Research Committee (6, tables 63-67, pp. 175-178). From Corn Belt Livestock Marketing Research Committee (7, pp. 9-11).

#### TRANSPORTATION CHARGES AS SHOWN BY RECORDS AT PUBLIC MARKETS

Railroad rates are based on published tariffs approved by the Interstate Commerce Commission, and are fixed between given points. Motortruck rates vary considerably but the trend during recent years has been towards greater standardization. As livestock trucks ordinarily do not operate over definite routes or according to fixed schedules, it is difficult to establish rates that can be applied uniformly.

<sup>1</sup> The Marketing and Transportation Situation, Use of Motortrucks and Rail for Shipping Livestock from Public Markets, U. S. Bureau of Agricultural Economics, pp. 24, May 1944, illus.

Services other than carrying commodities are generally performed by transportation agencies, and they may be included in the transportation charges. As these services are not altogether comparable for rail and motortruck movements, rate comparisons are difficult. In handling livestock, railroads provide stock pens and loading facilities at country shipping points for assembling and caring for the animals, and yards for feeding and watering in transit. Scales for weighing the livestock are also maintained at many of the yards. Charges for transportation cover these services, but feed and bedding are paid for separately. Truckers, on the other hand, do not maintain such facilities, but they pick up the livestock at the farm, usually provide loading chutes, and help load the animals into the motortruck.

A study of the cost of marketing Nebraska hogs at the Omaha terminal public market, covering the 6-year period 1930-35, showed that transportation per hundredweight for given distances was higher by motortruck than by rail (15). Transportation of hogs from counties located about 50 miles from the market cost 16 cents per hundredweight by rail and 20 cents per hundredweight by motortruck (table 15). For distances about 400 miles, rail rates were 37 cents per hundredweight and motortruck rates 43 cents. But as the services furnished by the two transportation means were not similar, the charges for transporting hogs by rail and motortruck were not strictly comparable. Farmers who shipped hogs by rail also had to deliver the animals to the local shipping point. Delivery may have been made in the farmers' motortrucks, or the trucking service may have been hired. If farmers engaged for-hire truckers to transport their hogs to the Omaha market the transportation charge covered the entire distance from the farm to the market. No attempt was made in the Nebraska study to adjust either the rail or the motortruck expenses so as to make the two comparable.

TABLE 15.—Cost of transporting hogs various distances by truck and rail from points in Nebraska to the Omaha public market, 1930-35

Approximate distance		Cost per hundred pounds		Cost per mile per hundred pounds	
		Rail	Truck	Rail	Truck
Miles		Cents	Cents	Cents	Cents
50		16	20	0.32	0.40
75		19	22	.25	.29
100		21	26	.21	.26
200		27	34	.14	.17
300		30	42	.10	.14
400		37	43	.09	.10

Lambrecht and Garey (15, p. 6).

The cost of transporting hogs per hundredweight, as shown by the Nebraska study, increased with distance, but the increase was not directly proportional to it. Cost of transportation per mile, on the other hand, decreased with distance. For counties approximately 50 miles from Omaha, the cost per mile per hundredweight by rail was 0.32 cents and by motortruck 0.40 cents. For distances about 400 miles the cost per hundredweight by rail was 0.09 cents per mile and by motortruck 0.10 cents per mile.

When livestock is transported by rail in excess of 28 hours it is required that they be fed, watered, and rested for 6 hours or more. However, the period may be extended to 36 hours at the request of the shipper. The feed given in transit is paid for by the shipper in addition to freight. The cost of the feed naturally varies with the level of feed prices.

The average rates charged per hundredweight by mile zones for cattle, calves, hogs, and sheep received at the Cincinnati market for the 4 years 1937-40 are shown in table 16 (13). Although the rates tended to increase with distance the increases were somewhat irregular, and the rates for individual loads hauled the same distance often varied considerably. Lack of uniformity in the average rates charged between distance zones may reflect the variability of rates charged by different truckers, and perhaps also for different loads hauled by the same trucker. The rates for livestock delivered to the Columbus and Cleveland markets varied substantially as they varied for deliveries to Cincinnati.

The rates for hauling livestock, as shown in these studies, were such as to make the per mile rate for a given weight much greater for short distances than for longer distances. This is because the time and expense involved in driving to the farm, loading the animals at the farm, and unloading and checking delivery at the market obviously must be allowed for in hauling all loads, irrespective of the distance from the farm to the market.

#### SHRINKAGE OF TISSUE IN TRANSIT

Livestock generally loses weight while in transit from the farm to market. This loss, or shrinkage, is of two kinds: Tissue shrinkage; and excretory shrinkage. Tissue shrinkage results from a decrease in the carcass weight of the animal whereas the loss in weight due to elimination of excreta does not change the weight of the carcass. The degree of tissue shrinkage tends to increase with the time in transit. Tissue shrinkage apparently results from the disturbed condition of the animal brought about by driving, loading, jostling in motortrucks or in railroad cars, being quartered in strange environment, and being mingled with animals to which it is not accustomed.

In Virginia, it was found that the net shrinkage of grass-fattened cattle shipped by rail from the southwestern part of that State to Jersey City in 1929 was 4.9 percent of their farm weight (11)<sup>9</sup>. The net shrinkage of animals in individual shipments ranged from about 2 percent to 7½ percent. The cattle included weighed an average of 1,526 pounds per head. The time in transit and in the yards was about 60 hours, and the animals were unloaded once on the way for feeding, watering, and resting.

In another study of the cost of marketing beef cattle from Virginia to Jersey City the net shrinkage of steers weighing an average of 1,440 pounds in 1924 was 4.7 percent. The net shrinkage of animals in individual cars varied from 1.8 to 6.6 percent (4). The time in transit to Jersey City was 64 hours, including a stop-over for feed, water, and

<sup>9</sup> Net shrinkage was assumed to be the difference between the loading weight at the shipping point and the weight of the animal when unloaded and after being fed at destination. It may not be equal therefore to the percentage of tissue shrinkage.

TABLE 16.—The average rate (cents per hundred) charged, by mile zones, for trucking livestock from Ohio farms to the Cincinnati market, by species, 1937-40

Distance 10-mile zones	Cattle				Calves				Hogs				Sheep			
	1937	1938	1939	1940	1937	1938	1939	1940	1937	1938	1939	1940	1937	1938	1939	1940
<i>Miles</i>																
0-9	20.0	16.1	18.4	22.4	62.7	54.3	71.6	33.5	11.6	14.6	25.5	19.1	17.1	23.5	19.1	
10-19	21.8	20.2	20.0	21.5	59.1	58.9	50.7	51.3	20.9	32.6	16.6	19.4	30.3	19.2	29.6	27.4
20-29	19.8	24.1	18.4	18.5	54.1	47.9	51.4	52.8	20.4	19.9	22.2	18.4	32.8	38.7	35.3	30.3
30-39	20.8	22.4	20.7	23.0	50.1	53.1	49.0	50.6	21.4	20.2	19.0	19.6	31.5	36.3	34.1	29.7
40-49	20.9	20.7	19.9	19.8	52.3	49.0	51.6	49.6	20.7	19.0	18.0	19.2	31.8	29.2	29.8	29.6
50-59	21.3	20.3	18.0	18.4	50.4	44.4	48.9	42.9	21.3	19.4	18.0	17.4	33.1	21.8	26.6	25.0
60-69	21.9	21.5	22.5	18.1	44.8	52.0	48.5	43.5	19.8	20.1	20.5	17.1	28.8	25.9	32.1	27.5
70-79	23.6	17.9	23.9	35.2	65.1	56.2	40.2	56.2	22.7	24.2	21.9	20.7	36.3	22.3	25.3	24.1
80-89	26.4	24.9	24.5	22.6	47.8	42.5	40.7	35.4	21.5	22.7	22.8	22.7	26.9	29.8	21.2	37.6
90-99	24.9	25.0	22.4	24.9	48.4	38.5	58.4	63.7	28.0		28.3	24.5				
100-109	24.0			25.0												
110-119																
120-129	28.4								24.3							
140-145												14.9				
180-189		7.1														
190-199				20.1												

Henning and Poling (13, table 23, p. 25).

rest. The cattle, on an average, remained in the yards 38 hours before they were weighed to the buyer. Steers weighing an average of 1,341 pounds shipped from north Virginia, the winter of 1924-25 had a net shrinkage of 4.2 percent. Steers shipped from southwestern Virginia in the summer and fall of 1926 showed a net shrinkage while in transit and in the yards of 5.2 percent.

A study of shrinkage in weight of beef cattle shipped from ranges in different parts of the West, Texas, and Montana to Chicago, St. Joseph, Kansas City and St. Louis markets were made by the Bureau of Animal Industry in 1913 (38). Shrinkage of cattle from the Southwest, after being fed and watered upon delivery, which was intended to approximate the condition of the animals at the time of shipment, was on an average 3.5 percent for cows, and 3.7 percent for mixed cattle for the first 36 hours in transit. In the Northwest, the net shrinkage averaged about 3.3 percent for all cattle for the same period in transit. Cattle in transit over 70 hours had average shrinkage of about 5.5 percent of the live weight, the rate ranging from 4 to 7 percent.

In a study of shrinkage of hogs made by the Bureau of Agricultural Economics, involving more than 6,300,000 head, tissue and excretory shrinkage were segregated (3). The study showed that tissue shrinkage began early in the period of transit and continued until hogs reached the plant to which they were shipped for slaughter. Shrinkage of tissue took place when the animals were fed and watered in transit. Tissue shrinkage was found to increase as time in transit increased, the rate of increase tending to be greater during the earlier period than after hogs had been on the way a longer time. Tissue shrinkage in lightweight hogs took place at a higher rate than in hogs of heavier weight. The average tissue shrinkage of hogs weighing 180 to 199 pounds was 2.4 percent of the live weight when in transit 36 hours, and 3.4 percent when in transit 60 hours. Tissue shrinkage of hogs weighing 260 to 279 pounds averaged 1.3 percent when in transit 36 hours and 2.1 percent when they were in transit 60 hours.

Figures on the shrinkage of sheep in transit are meager, but studies of rail shipments by cooperative associations in 1921 show that their total shrinkage was at higher rates than that for either cattle or hogs transported the same distance.<sup>10</sup> Shrinkage during the spring and summer was greater than during the fall and winter.

#### BRUISING, DEATH, AND CRIPPLING

Losses from bruising, death, and crippling may occur while animals are being loaded at the farm, on the way to market, at the market, or after they are bought by the packer (9). Most of the loss from bruising cannot be detected until after the animal is slaughtered. Slaughterers, therefore, take average losses from bruising into account at the time of purchase. Consequently, under present conditions, losses from bruising tend to be shared by all sellers regardless of whether the particular animal sold is bruised or not.

Bruising, death, and crippling may result from accidents or from improper handling. Most bruises are caused by horned cattle; by pro-

<sup>10</sup> UNITED STATES BUREAU OF AGRICULTURAL ECONOMICS. COST OF MARKETING SHEEP IN THE CORN BELT, 1921. U. S. Bur. Agr. Econ. Prelim. Rp. 16 pp. 1923. [Processed.]

jections in feed lots, motortrucks, cars, and stockyards; by failure properly to partition different kinds and classes of livestock in the cars or in motortrucks, by overloading or underloading and by rough handling. The factors responsible for bruising may also be responsible for much of the loss from death and crippling. Although some of these factors are beyond the control of producers, dealers, and transportation agencies, it is apparent that by proper care and handling such injury or loss of livestock can be materially reduced.

### MARGIN AND COSTS FOR MEAT PACKING

Meat packing is a term applied to the industry whose principal functions are slaughtering livestock and processing meat, although it may handle other products or perform other functions. The term was descriptive of the industry during its early period when the packing of pork was its principal operation. The packing of meat has now largely been replaced by other processing but the early name of the industry persists. The term "margin and costs of meat packing," as used in this study, applies to the meat-packing industry and comprises all of its functions, as it is not possible from available data to confine these functions to slaughtering and meat processing.

The meat-packing function does not include the wholesale distribution of meat and meat products by packing concerns. This operation has been segregated, and is discussed in a separate section of this publication.

### MEAT-PACKING OPERATIONS AND SERVICES PERFORMED

In addition to slaughtering and meat processing, a large number of meat-packing concerns, especially the larger ones, handle many other products and perform other operations. They may handle dairy products, poultry products, fish and other seafood, and may use vegetable oils and other ingredients in their manufacture. They may operate poultry-dressing plants, they may candle and grade eggs, can perishable products other than meat, manufacture butter, cheese, margarine, and other shortening, and operate tanneries and fertilizer plants. Smaller concerns may not use in their plants all of the byproducts obtained from slaughtering operations, but may sell both edible and inedible byproducts to other concerns that use them in manufacturing and processing. Meat packers may sell meat to other packers, or to concerns that process but do no slaughtering. Before margin and costs of meat packing concerns are discussed a brief review will be given of the scope of the industry and its operations.

### NUMBER OF PACKING PLANTS AND THEIR OPERATIONS

Meat-packing plants are distributed throughout the United States, but the volume of slaughter is largest in the North Central States. Slaughtering plants are most numerous in Pennsylvania, New York, Ohio, Michigan, and Texas, but many are relatively small. Packing plants range in size from small establishments in which livestock is slaughtered only for local distribution to large establishments in which more than a million hogs in addition to considerable other livestock are slaughtered annually. The four largest meat-packing concerns, sometimes referred to as national packers, each operate from 8 to about 50 plants. A few other packing companies have two or more plants each.

The national packers operate many of the larger packing plants, but some of the other packing concerns have individual plants that are among the largest in the country. In addition to the packing plants where slaughtering is done, some plants are engaged principally in the manufacture of sausage and specialty meats.

Packing plants that distribute products interstate, those furnishing products for the export trade, for the armed forces, and for Lend-Lease, slaughter and prepare their meat and meat products under Federal inspection. Such inspection is not required of plants from which the products are distributed within the borders of the State where they are located. Some plants not under Federal inspection, however, have meat-inspection service provided by the State or municipality. The inspection of meat and the supervision of slaughtering are carried on to guard against the sale of products that are diseased or otherwise unfit for human consumption.

The United States Census of Manufactures reported 1,478 wholesale slaughtering and meat-packing establishments in 1939 (22). Records of the War Food Administration show that in 1944 there were 365 wholesale slaughtering plants in each of which more than 2,000,000 pounds of meat were produced in 1941, and about 3,000 local plants in each of which from 300,000 pounds to 2,000,000 pounds of meat were produced from slaughter. Some of the plants in the smaller group were operated under Federal inspection and others were not federally inspected. A few of the smaller plants were probably operated by retailers but apparently most of them were wholesale slaughtering establishments. In addition, there were about 23,000 butchers who produced less than 300,000 pounds of meat from slaughter in 1941. In 1939, some butchering was reported on more than 4 million farms, the animals butchered having a reported value of \$198,000,000 (31).

The number of packing plants operating under Federal inspection in the United States varies from time to time. In June 1939, the total was 281. Of this number, cattle were slaughtered in 246 plants, calves in 239 plants, hogs in 211 plants, and sheep and lambs in 187 plants. During the war, the number of plants under Federal inspection were increased greatly, so that they would be eligible to furnish meat and meat products to the armed forces and for Lend-Lease. As of June 30, 1944, a total of 481 packing plants operated under Federal inspection. Of these, cattle were slaughtered in 428 plants, calves in 365 plants, hogs in 322 plants, and sheep and lambs in 298 plants. The increase in the number of federally inspected plants apparently resulted in a reduction of about the same number of plants operating without Federal inspection as few new plants have been established since 1939.

As several of the larger packing companies operate more than one plant, the total number of concerns operating under Federal inspection is naturally smaller than the number of plants under inspection. In 1939, 196 packing concerns slaughtered under Federal inspection according to the Packers and Stockyards Division (table 17).<sup>11</sup> There were

<sup>11</sup> From annual reports filed by meat-packing concerns with the United States Department of Agriculture in connection with the administration of the Packers and Stockyards Act. Each concern included all of the plants it operated in the consolidated statement. In cases where slaughtering concerns also operated nonslaughtering plants, these plants were included in the consolidated statement of the concern.

TABLE 17.—Number of meat-packing concerns and their total sales, classified by size and by kind of operation, 1936-40

Net worth and kind of operation	Concerns					Total sales				
	1936	1937	1938	1939	1940	1936	1937	1938	1939	1940
	Number	Number	Number	Number	Number	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars
<b>Federally inspected slaughterers</b>										
General packers										
Over \$2,000,000	4	4	4	4	5	2,003,607	2,148,129	1,043,992	1,920,209	2,068,012
\$4,000,000 to \$20,000,000	6	6	6	6	6	285,599	317,139	302,589	310,748	264,148
\$1,000,000 to \$4,000,000	19	21	19	17	19	165,502	201,230	181,389	172,130	155,017
Under \$1,000,000	82	75	78	80	70	119,469	119,205	124,412	122,423	120,465
Pork packers										
Over \$1,000,000	10	8	7	7	8	68,522	62,711	50,439	57,816	55,335
Under \$1,000,000	16	13	14	17	15	38,448	40,446	43,516	38,018	33,728
Beef packers under \$1,000,000	33	32	32	37	35	39,476	46,849	51,453	59,119	63,104
Beef and mutton packers under \$1,000,000	25	29	28	26	31	31,127	43,682	37,882	37,807	42,012
<b>Total</b>	<b>195</b>	<b>188</b>	<b>188</b>	<b>196</b>	<b>189</b>	<b>2,751,700</b>	<b>2,979,391</b>	<b>2,735,672</b>	<b>2,728,270</b>	<b>2,801,821</b>
<b>Nonfederally inspected slaughterers</b>										
General packers										
Over \$1,000,000	3	3	2	3	4	17,110	19,551	11,798	19,289	22,626
Under \$1,000,000	224	241	255	275	270	178,528	217,464	216,423	244,850	252,583
Pork packers										
Over \$1,000,000	2	2	2	2	1	6,868	8,130	7,971	7,915	5,361
Under \$1,000,000	28	21	22	22	20	14,404	12,389	11,347	11,816	10,557
Beef packers: Under \$1,000,000	44	41	36	38	42	15,972	19,699	22,107	19,454	21,616
Mutton packers: Under \$1,000,000	6	7	6	4	5	350	367	316	2,218	2,924
Beef and mutton packers under \$1,000,000	87	82	84	81	73	36,361	40,513	38,994	41,650	38,857
<b>Total</b>	<b>94</b>	<b>397</b>	<b>407</b>	<b>425</b>	<b>415</b>	<b>269,593</b>	<b>318,113</b>	<b>308,976</b>	<b>347,192</b>	<b>356,524</b>
<b>Nonslaughters:</b>										
Federally inspected:										
Over \$2,000,000	3	2	2	2	2	154,975	89,640	103,719	113,328	15,108
\$4,000,000 to \$20,000,000	3	3	3	3	4	51,518	56,717	58,670	63,261	112,935
\$1,000,000 to \$4,000,000	11	11	8	6	5	51,443	55,785	39,632	27,705	17,762
Under \$1,000,000	166	163	163	166	161	117,396	135,180	131,915	132,391	150,319
Nonfederally inspected: Under \$1,000,000	43	44	44	32	45	20,921	25,446	20,397	15,165	20,148
<b>Total</b>	<b>226</b>	<b>223</b>	<b>220</b>	<b>209</b>	<b>217</b>	<b>396,255</b>	<b>362,768</b>	<b>354,333</b>	<b>351,850</b>	<b>406,272</b>
<b>Total all packers</b>	<b>815</b>	<b>808</b>	<b>815</b>	<b>830</b>	<b>821</b>	<b>3,417,548</b>	<b>3,660,272</b>	<b>3,398,981</b>	<b>3,427,312</b>	<b>3,564,617</b>

Summary of consolidated annual reports filed by meat packing concerns with the United States Department of Agriculture in connection with the administration of the Packers and Stockyards Act.



also 425 nonfederally inspected slaughterers, and 209 concerns which processed meat but did no slaughtering. Of the nonslaughtering concerns, 177 operated under Federal inspection, and 32 concerns did not have their products federally inspected.

Of the 621 slaughtering concerns reporting in 1939, 387 were general slaughterers, 48 concerns slaughtered pork only, 75 slaughtered beef only, 4 slaughtered lamb and mutton only, and 107 combined the slaughter of beef, and lamb and mutton. Of the total sales, 91 percent represented products of general slaughterers, 4 percent of pork slaughterers, and 5 percent of slaughterers of beef, lamb and mutton, or their combination.

Forty-one concerns reported net worth of \$1,000,000 or more each in 1939, but their sales amounted to 81 percent of the sales by all concerns. Sales by the other 580 concerns, with net worth under \$1,000,000 each, comprised 19 percent of total sales.

The nonslaughtering concerns are smaller, on an average, than those that slaughter. Of the 209 nonslaughtering concerns reporting in 1939, 11 had net worth of \$1,000,000 and over, but their sales comprised 58 percent of the total sales by all nonslaughterers. The other 198 nonslaughtering concerns had net worth under \$1,000,000. Their aggregate sales made up 42 percent of the sales by all concerns.

#### OUTPUT BY KINDS OF SLAUGHTERERS

About 66 percent of the total estimated output of meat in the United States was produced in wholesale slaughtering plants under Federal inspection in 1939 (table 18). An additional 14 percent was produced in nonfederally inspected wholesale slaughtering plants. Slaughter by retail dealers amounted to 8 percent of the total, and slaughter on farms 12 percent. The increase in the number of plants that slaughtered under Federal inspection during the war, brought the output of meat from federally inspected plants to 73 percent of the total in 1944.

The slaughter in both retail establishments and on farms has become relatively less important since the early part of this century. Farm slaughter has continued to be important for hogs, but is less important for cattle, calves, and sheep and lambs. Of the livestock slaughtered on farms, part is sold as meat but most of the meat is consumed by the farm family. For 1939, it was estimated that 47 percent of the farm-slaughtered meat from cattle and calves, 16 percent from hogs, and 23 percent from sheep and lambs was sold by the farmers. The sale of both farm-slaughtered and retail-slaughtered meat increased during the war. This comprised some farm-slaughtered meat sold to nonfarmers, slaughter by nonfarmers for their own consumption or for sale, and slaughter by retail meat dealers for disposal through their markets.

The various species of livestock are not slaughtered in the different types of establishments, and on farms, in the same proportion. Sheep and lambs are slaughtered in federally inspected plants to a relatively greater extent than other livestock, amounting to about 80 percent of the total in 1939. Retail and farm slaughter of sheep and lambs is especially small. Veal is slaughtered in noninspected wholesale slaughtering plants and in retail establishments in larger proportion than other livestock. Farm slaughter of hogs amounted to about 20 percent of the total hog slaughter for the country in 1939.

TABLE 18.—*Estimated production of meat produced in the United States, by types of slaughter, and by species, 1939*

Type of slaughter	Beef		Veal		Pork (Excluding lard)		Lamb and mutton		All meats	
	Million pounds	Percent	Million pounds	Percent	Million pounds	Percent	Million pounds	Percent	Million pounds	Percent
Federal inspected, wholesale.....	4,803	68.5	559	56.4	5,552	64.1	694	79.6	11,608	66.2
Noninspected, wholesale.....	1,224	17.5	192	19.4	848	9.8	106	12.1	2,370	13.5
Retail.....	758	10.8	156	15.7	489	5.6	46	5.3	1,449	8.3
Farm.....	226	3.2	84	8.5	1,771	20.5	26	3.0	2,107	12.0
Total.....	7,011	100.0	991	100.0	8,660	100.0	872	100.0	17,534	100.0

Unpublished data from Bureau of Agricultural Economics.

Considerable meat is sold by some packers to other packers, or is transferred from one plant to another plant of the same concern. In 1939, the wholesale meat packers reported a total of 1,650 million pounds of meat involved in such transfer. This represented 10.8 percent of the 15,255 million pounds of fresh and processed meats produced in the wholesale meat-packing establishments that year.

In addition to slaughtering livestock, wholesale meat-packing establishments process considerable meat and other packing-house products. This includes curing and smoking hams, shoulders, and bacon; grinding meat; making hamburger and sausage; rendering lard and other animal fats; canning, dehydrating, freezing, and pre-cooking meat. In 1939, the wholesale meat-packing establishments reported that of the total output of meat (excluding lard, rendered fats, casings, and tankage), 28 percent was converted at their plants to cured and canned meats, to different kinds of sausages, and other prepared meats (32). The other 72 percent was fresh meat. This did not represent the proportions of the different kinds of meat sold to consumers, because packers sold some fresh meat to others who operated establishments for processing, but which did not slaughter. In 1939, the 1,067 plants doing processing but no slaughtering reported products valued at \$208,048,000.

The total value of all products produced in the wholesale meat-packing plants was \$2,648,325,552 in 1939. The aggregate value of all meat and byproducts derived from livestock was reported at \$2,400,147,646, or 90.6 percent of the total value of all products. According to this, the products other than meat and byproducts of livestock slaughter amounted to 9.4 percent of the value of all products handled by the packers in the United States that year. The most important of the non-meat products handled by packers were shortening, margarine, butter, cheese, eggs, poultry, and sea foods.

Of the total output of livestock products in wholesale meat-packing and custom-slaughtering establishments, based on value, 61 percent was fresh meat and 29 percent processed meat, or a combination output of meat of 90 percent in 1939 (table 19) (32). Lard, oils, and oil stocks had a value of about 5 percent of the total. Hides, skins, pelts, wool, hair, and miscellaneous items comprised the other 5 percent. Fresh meat included beef, veal, pork, mutton and lamb, and edible organs from the

TABLE 19.—Value of livestock products of 1,285 wholesale meat packing industries and of secondary products in the wholesale custom-slaughtering industry for the United States, 1939<sup>1</sup>

Products	Value	Percentage
	1,000 dollars	Percent
Fresh meat .....	1,457,550	60.7
Processed meats .....	497,897	29.1
Lard, oils, and oil stocks.....	114,127	4.8
Dog and cat food.....	8,873	.4
Livestock byproduct feed and fertilizer materials.....	5,731	.2
Hides, skins, pelts, wool, and hair.....	115,970	4.8
Total.....	2,400,148	100.0

<sup>1</sup> Reports represent 98 percent of the total value of the products for the industries. Data for sausages, prepared meats, and other meat products made in other than meat-packing establishments not included.

United States Bureau of Census (32, p. 57).

animals producing the meat. The processed meat was that classified as cured, canned, and sausage. Sausage made up nearly one-fourth of all processed meat combined. Canned meat and canned sausage were relatively unimportant. Among the inedible items were dog and cat food, and products used for feed materials and for fertilizer materials.

#### IMPORTANCE OF MEAT PROCESSING

Of the combined value of all meats marketed from the wholesale meat-packing establishments and from the nonslaughtering processing establishments combined in 1939, about 60 percent was fresh meat and 40 percent was processed meat and products (sausage, and cured, canned, and other processed meats). In estimating the value of products sold for consumption as fresh meat it is necessary to reduce the value of the fresh meat produced in wholesale meat-packing establishments by the quantity purchased for the plants doing only processing. The value of the fresh meat purchased for processing at the nonslaughtering processing plants is not reported separately in the Census of Manufactures, but is included with the cost and containers. Of this combined total, the cost of meat (materials) was about 81 percent, and the cost of supplies and containers about 19 percent, according to reports from representative concerns in the industry<sup>12</sup>. According to this, the fresh meat purchased for the nonslaughtering processing plants had a value of \$131,820,000. Deducting this from the value of the total output of fresh meat by wholesale meat-packing establishments of \$1,457,550,000 left \$1,325,730,000 of meat that was distributed for consumption in fresh form. The value of the combined processed products of both wholesale meat-packing plants and the nonslaughtering processing plants was equal to \$880,645,000.

Of the combined output of meat by wholesale meat-packing concerns and by the nonslaughtering processing concerns in 1939, expressed in terms of weight, approximately 65 percent was sold fresh and 35 percent was sold in processed form. The reason the proportion of the total meat processed was smaller when measured in terms of weight than in terms of value was that processing had added to the value of the product. The average wholesale value of fresh meat produced in wholesale meat-packing establishments in 1939 was 13.3 cents per pound compared with an average value of 17.0 cents per pound for all processed meat. The increase in the average value of the processed product was in part accounted for by the reduction in its weight compared with the weight of fresh meat, although the weight of some meat is increased as a result of processing. It should not be inferred, however, that all processed products are of relatively high value, because some sausage and some other processed products are made from meat of low quality. On the other hand, raw materials of relatively high value are used for the production of considerable volume of these products.

Meat obtained from the various species of animals is sold fresh, and in processed form in different proportions. Normally, 90 percent of the beef is sold fresh and 10 percent as sausage and as cured or otherwise

<sup>12</sup> Based on data obtained from three important nonslaughtering processors through courtesy of National Association of Non-slaughtering Meat Processors and Wholesalers, Inc.

processed meats (1). Of the pork, about 40 percent is normally sold fresh, 50 percent is cured, and 10 percent is made into sausage. Virtually all of the veal and lamb and mutton is sold fresh.

**Sausage.**—The consumption of sausage has increased considerably over a period of years. In 1929, the combined output in the wholesale meat-packing establishments and in the nonslaughtering processing establishments was equal to 8.8 percent of the total dressed weight of meat produced in the wholesale meat-packing establishments (table 20). In 1939, it was 11.2 percent. The production of sausage as a proportion of the total output of meat varied during the intervening period, the highest reported by the Census of Manufactures was in 1937 when it amounted to 12.3 percent. The production of sausage in nonslaughtering plants has been relatively important but data on the quantity produced before 1929 are not available.

TABLE 20.—Sausage produced in wholesale meat packing and special sausage plants in relation to total production of meat obtained from slaughter in wholesale meat-packing establishments for related years 1929 to 1939<sup>1</sup>

Year	Sausage produced <sup>2</sup>	Dressed weight of meat produced	Sausage as percentage of total meat <sup>3</sup>
	Million pounds	Million pounds	Percent
1929 .....	1,333	15,155	8.8
1931 .....	1,231	14,495	8.5
1935 .....	1,353	11,860	11.4
1937 .....	1,621	13,204	12.3
1939 .....	1,702	15,163	11.2

<sup>1</sup> Comparable figures not available for 1933 and for years before 1929.

<sup>2</sup> The weight of some sausage is less than the weight of the meat from which it is produced, but the weight of other sausage is greater. For all sausage produced, the weight probably is not greatly different from the meat that goes into its manufacture.

United States Bureau of the Census (32, pp. 57, 68).

Among the large variety of sausages, "frankfurts" have increased greatly in popularity, and are sold throughout the United States. They are widely used for picnics and for lunches at other outdoor gatherings. Roadside stands and lunchrooms along the more important highways virtually all serve frankfurts. The consumption of different kinds of sausages, as well as some other prepared meats, has also increased in households. Some of these meats are ready to use when purchased, and others can be prepared quickly and conveniently.

**Cured Meat.**—The output of cured meat in wholesale meat-packing establishments has decreased during the last two decades (table 21). In 1921, cured meat amounted to 25.0 percent of the dressed weight of the animals slaughtered. The proportion decreased to 18.0 percent in 1935, but rose to 19.3 percent in 1939. Canned meat, on the other hand, increased during this period. The relative decrease in production of cured meat is in part compensated for by the increase in the production of sausage. During the war, the volume of canned and other processed meats increased greatly. Data on the production of cured and canned meats in nonslaughtering packing establishments are not available.

**Boning Meat.**—Boning meat at packing plants has been primarily in connection with its preparation for use in hamburger, sausage, and canning. As a considerable volume of meat used for these purposes is from

TABLE 21.—Percentage of total dressed weight of meat produced by slaughter, converted to cured and canned meats in wholesale meat-packing establishments, by census years, 1921-39<sup>1</sup>

Year	Cured meats <sup>2</sup>	Canned meats <sup>2</sup>	Dressed weight of meat produced	Percentage of dressed weight	
				Cured meats <sup>2</sup>	Canned meats <sup>2</sup>
	Million pounds	Million pounds	Million pounds	Percent	Percent
1921 .....	3,064	75	12,237	25.0	0.6
1923 .....	3,975	95	15,641	25.4	.6
1925 .....	3,380	119	14,455	23.4	.8
1927 .....	3,370	144	14,607	23.1	1.0
1929 .....	3,752	150	15,155	24.8	1.0
1931 .....	3,235	91	14,495	22.3	.6
1935 .....	2,139	183	11,860	18.0	1.5
1937 .....	2,389	241	13,204	18.1	1.9
1939 .....	2,919	331	15,163	19.3	1.5

<sup>1</sup> Comparable data not available for 1933. Data for establishments that make sausage and other prepared foods omitted, as they are available for only part of the period.

<sup>2</sup> Data on canned sausage included with other canned meats for period 1921 to 1927 as they are not available separately. Canned sausage was relatively unimportant.

Fresh meats decrease in weight when cured or canned, the percentage decrease varying with the process. The weight of cured meats apparently will average between 75 and 80 percent of the fresh meat from which they are produced, and canned meats about 70 percent.

United States Bureau of the Census (32, pp. 57, 68).

low-grade animals, boning has mostly been confined to carcasses of canner and cutter grades, and sausage bulls. The boned roasts bought by housewives have mainly been prepared at the retail meat markets.

The pre-cutting of meat at the packing plant has made slow progress. When done, it has involved some boning. If pre-cutting of meat should increase, it is expected that boning at the plant will become more common than it was before the war. The extent to which meat will be boned at the plant will probably be influenced largely by the extent to which the quick-frozen meat industry develops. It is expected that, if the distribution of frozen meat becomes general, most of the boning, cutting into retail cuts, wrapping, packaging, and freezing will be performed at the packing plant.

The proportion of a carcass made up of bone varies with its grade or quality. It also varies with the species of livestock from which it is derived. Studies in the United States Department of Agriculture show that for beef steer carcasses grading Choice, the bone, ligament, and tendon comprised 16 percent of the weight, and the edible portion 84 percent (table 22).<sup>13</sup> The bone, ligament, and tendon from carcasses of Good grade steers was 18 percent, from Commercial grade 20 percent, and from Utility grade 21 percent. The edible portion of lamb carcasses was slightly smaller than for beef steers.<sup>14</sup> The hog carcass contains a smaller proportion of bone than do beef and lamb carcasses, but the skin from the hog carcass also is usually removed when preparing retail cuts. In general the bone and skin combined were found to comprise a slightly larger proportion from the hog carcass than the bone, ligament, and tendon from the beef carcass, but a slightly smaller proportion

<sup>13</sup> HANKINS, O. G., and FOSTER, M. T. APPROXIMATE PHYSICAL COMPOSITION OF THE PRIMARY CUTS FROM STEER CARCASSES OF DIFFERENT MARKET GRADES. U. S. Bur. Anim. Indus. and Agr. Market Serv. 3 pp. 1940. [Processed.]

<sup>14</sup> HANKINS, O. G., and FOSTER, M. T. APPROXIMATE PHYSICAL COMPOSITION OF THE PRIMARY CUTS FROM LAMB CARCASSES OF DIFFERENT MARKET GRADES. U. S. Bureau Anim. Indus. and Agr. Market Serv. 3 pp. 1940. [Processed.]

than the bone and ligament from the lamb carcass. In the test of hog carcasses, animals of different weights were included.<sup>16</sup> Classification by weight was used because the degree of finish in hogs tends to be directly related to the live weight of animals of the same type produced under conditions of normal feeding and management.

TABLE 22.—Approximate average physical composition of carcasses of cattle, hogs, and lambs of the different grades

		CATTLE <sup>1</sup>			
Components of carcass	Unit	Grade			
		Choice	Good	Commercial <sup>2</sup>	Utility <sup>3</sup>
Cattle used in test.....	Number	10	25	30	6
Average final feedlot weight....	Pounds	879	880	903	793
Average chilled carcass weight....	do.	523	512	520	436
Dressing yield.....	Percent	79.5	58.2	57.6	55.0
Carcass (right side) as analyzed:					
Separable fat.....	do.	31.0	24.5	20.4	15.0
Separable lean.....	do.	53.8	57.4	59.4	63.7
Edible portion.....	do.	84.0	81.9	79.8	78.7
Bone, ligament, and tendon.....	do.	16.0	18.1	20.2	21.3

		LAMBS <sup>4</sup>					
Components of carcass	Unit	Grade					
		Prime	Choice	Good	Commercial <sup>1</sup>	Utility <sup>1</sup>	Cull
Lambs used in test.....	Number	6	17	13	4	6	5
Average chilled carcass weight <sup>1</sup> ..	Pounds						
Carcass as analyzed:							
Separable fat.....	Percent	32.5	29.6	22.5	18.6	16.2	7.1
Separable lean.....	do.	50.1	50.4	53.8	58.2	55.1	57.8
Edible portion.....	do.	82.6	80.0	76.3	76.8	71.3	64.9
Bone and ligament.....	do.	17.4	20.0	23.7	23.2	28.7	35.1

		HOGS (INTERMEDIATE TYPE) <sup>5</sup>			
Components of carcass	Unit	Weight group (alive)			
		215-254 pounds	210-234 pounds	180-209 pounds	167-179 pounds
Hogs used in test.....	Number	5	19	31	9
Average live weight.....	Pounds	250	225	200	175
Average dressed weight.....	do.	197	178	158	139
Dressing yield.....	Percent	78.8	79.1	79.0	79.4
Carcass as analyzed:					
Separable fat.....	do.	45.0	42.2	39.5	36.8
Separable lean.....	do.	36.7	38.0	39.3	40.6
Bone.....	do.	12.1	13.3	14.6	15.8
Skin.....	do.	6.2	6.5	6.6	6.8

<sup>1</sup> Abstracted from Hankins and Foster. See footnote 13, p. 43.

<sup>2</sup> The grades Commercial and Utility were designated Medium and Common, respectively before October 5, 1940, but the standards for the grades were not changed.

<sup>3</sup> Abstracted from Hankins and Foster. See footnote 14, p. 43.

<sup>4</sup> Live weight of lambs were not reported.

<sup>5</sup> Abstracted from Hankins and Hiner. See footnote 15, p. 44.

The proportions of fat and lean in the edible portions of carcasses of beef, lamb, and pork were also determined in these studies. They showed that the proportion of fat and the grade of a carcass are directly related.

A study to determine the yield of usable meat, and the proportion of lean, fat, and bone from 15 beef sides in each of the grades "AA—,"

<sup>16</sup> HANKINS, O. C., and HINER, R. L. THE PHYSICAL COMPOSITION OF THE DRESSED CARCASS AND CUTS IN RELATION TO LIVE WEIGHT OF THE HOG OF INTERMEDIATE TYPE. U. S. Bur. Anim. Indus. and Agr. Market. Serv. 3 pp. 1943. [Processed.]

"A+," and "B," from yearling and 2-year old steers, was made by Wilson and Company in cooperation with the University of Illinois, the National Livestock and Meat Board, and the United States Department of Agriculture (39). The bone and sinew were equal to 17 percent for the AA— grade, 18 percent for the A+ grade and 21 percent for the B grade, which agree closely with the results of the study made in the Department of Agriculture (table 23). The percentage of usable meat in each grade was somewhat different, the boneless cut accounting for a smaller percentage, and the trimmings for a slightly larger percentage in the carcasses of the higher grades than in those of the lower grades. Naturally the excess fat was relatively high for carcasses of high grade and relatively low for carcasses of low grade.

TABLE 23.—Average weight and percentage of usable meat, excess fat, and bone in 15 sides of steer carcasses in each of three grades

Item	Total Weight			Percentage		
	AA—	A+	B	AA—	A+	B
	Pounds	Pounds	Pounds	Percent	Percent	Percent
Hindquarter .....	2,763.0	2,501.0	2,095.5	.....	.....	.....
Usable meat .....	1,973.0	1,804.5	1,552.0	71.4	72.2	74.0
Boneless cuts .....	1,655.0	1,513.0	1,308.3	59.9	60.5	62.4
Trimmings .....	318.0	291.5	243.5	11.5	11.7	11.6
Excess fat .....	327.0	246.0	111.0	11.8	9.8	5.3
Bone, sinew .....	452.0	445.5	425.0	16.4	17.8	20.3
Forequarter .....	3,178.5	2,926.5	2,377.5	.....	.....	.....
Usable meat .....	2,507.5	2,291.0	1,844.0	78.9	78.3	77.6
Boneless cuts .....	2,190.5	2,015.0	1,614.0	68.9	68.9	67.9
Trimmings .....	317.0	276.0	230.0	10.0	9.4	9.7
Excess fat .....	110.0	85.0	22.0	3.5	2.9	.9
Bone, sinew .....	549.5	544.5	503.0	17.3	18.6	21.2
Sole (hindquarter and forequarter) .....	5,941.5	5,427.5	4,473.0	.....	.....	.....
Usable meat .....	4,480.5	4,095.5	3,396.0	75.4	75.5	75.9
Boneless cuts .....	3,845.5	3,528.0	2,922.5	64.7	65.0	65.3
Trimmings .....	635.0	567.5	473.5	10.7	10.5	10.6
Excess fat .....	437.0	331.0	133.0	7.4	6.1	3.0
Bone, sinew .....	1,001.5	990.0	928.0	16.9	18.2	20.7

Wilson & Co. Inc., and others (39, p. 18).

The percentage of bone in the primary cuts from the same carcass was found to vary greatly. In general, the percentage of bone was higher in carcasses of low quality than in those of high quality. For hogs, the percentage of bone decreased as the animal increased in weight. This probably also applies to other species of animals. In a steer carcass of Good grade, the bone in the loin end was equal to 14 percent of its weight, and in the foreshank 43 percent (table 24).<sup>16</sup> Loin of a lamb carcass of the same grade had 16 percent bone, and the neck 35 percent.<sup>17</sup> In a carcass from a hog weighing 225 pounds when alive, the ham and full-cut shoulder had 10 percent bone, but the bone in the shoulder ribs was equal to 58 percent.<sup>18</sup>

*Dehydrated Meat.*—Some meat was dehydrated during the war, for shipment abroad. The main advantages of this process have been to reduce both the volume and weight of the product and thus to conserve shipping space and tonnage, and to aid in their preservation. That dehydrated meat will make appreciable inroads into the domestic meat

<sup>16</sup> Hankins and Foster, see footnote 13, p. 43.

<sup>17</sup> Hankins and Foster, see footnote 14, p. 43.

<sup>18</sup> Hankins and Hiner, see footnote 15, p. 44.



TABLE 24.—Percentage of bone in primary cuts and carcasses of beef steers, and lamb and pork, of different grades and weights

## BEEF STEERS

Primary cuts and carcasses	Grade of carcass			
	Choice	Good	Commercial <sup>1</sup>	Utility <sup>4</sup>
	Percent	Percent	Percent	Percent
Standing rib <sup>2</sup>	18.9	22.2	25.4	26.9
Chuck <sup>2</sup>	15.8	18.7	19.9	20.6
Brisket	14.3	18.2	22.3	22.5
Navel	14.2	16.0	20.9	23.4
Fore Shank	41.8	42.9	46.6	46.5
Short loin	12.4	15.3	17.2	16.8
Loin end	12.1	13.6	14.7	15.4
Round with hindshank <sup>2</sup>	18.7	19.1	20.5	22.4
Rump	20.7	22.8	26.8	25.5
Flank	1.1	1.1	.9	1.2
Carcass <sup>4</sup>	16.0	18.1	20.2	21.3

## LAMB

Leg (trimmed)	16.0	18.5	16.8	21.8
Rib cut (9 ribs) <sup>2</sup>	19.8	24.6	25.3	32.4
Shoulder (3 ribs) <sup>2</sup>	18.7	22.0	20.2	25.9
Loin	13.5	16.2	16.4	20.5
Neck <sup>2</sup>	31.6	34.9	30.7	40.5
Breast	25.8	30.3	29.9	35.6
Carcass <sup>2</sup>	20.0	23.7	23.2	28.7

## PORK

	250 lbs. alive, 197 lbs. dressed <sup>2</sup>	225 lbs. alive, 178 lbs. dressed	200 lbs. alive, 158 lbs. dressed	175 lbs. alive, 139 lbs. dressed <sup>2</sup>
	Percent	Percent	Percent	Percent
Ham	9.3	9.8	10.3	10.9
Loin	20.9	21.4	22.0	22.5
Bacon	.....	.....	.....	.....
Shoulder, full-cut	9.4	10.0	10.7	11.4
Head, full-cut	30.0	33.0	35.9	38.8
Spare ribs	36.9	39.4	41.9	44.4
Shoulder ribs	55.3	57.6	60.0	62.3
Carcass	12.1	13.3	14.6	15.8

<sup>1</sup> The grades Commercial and Utility were designated Medium and Common, respectively, prior to October 5, 1940. The standards for the grades were not changed.

<sup>2</sup> Bone and ligament.

<sup>3</sup> Bone and tendon.

<sup>4</sup> Bone, ligament, and tendon.

<sup>5</sup> The percentage of skin from pork cuts and carcasses of live hogs weighing 175 pounds, and 250 pounds, respectively are as follows: Ham, 4.6 and 4.8 percent; bacon, 8.2 and 6.1 percent; shoulder, full-cut, 5.2 and 4.9 percent; head, 16.6 and 17.2 percent.

Abstracted from Hankins and Foster. See footnote 13, p. 43.

Abstracted from Hankins and Foster. See footnote 14, p. 43.

Abstracted from Hankins and Hiner. See footnote 15, p. 44.

trade after the war appears doubtful, although it may be used to some extent in areas where fresh meat is difficult to obtain.

**Frozen Meat.**—Freezing meat and selling it in frozen form to consumers in the domestic market has been of minor importance. Freezing has been employed to some extent for fresh meat held in storage at the packing plant. Beef from Argentina and lamb from Australia have been exported from those countries in frozen or chilled form.

If the frozen-meat industry develops after the war, processing operations in packing plants are expected to be greatly expanded as the meat

will need to be specially prepared as well as frozen before it is distributed. Preparation and freezing might also be done in cutting and freezing rooms of retail chains and super-markets. The special preparation will include cutting into retail cuts, boning, wrapping, packaging, labeling according to grade and weight, and freezing. To perform these operations in the packing plant, or at some other central point will reduce the services now required in retail stores in the handling of fresh meat. If meat is to be distributed in frozen form some modification must be made in the equipment used for distribution and transportation of the product.

### MARGIN FOR MEAT PACKING

The gross margin for meat-packing concerns and the break-down of this margin into its various cost items, may be made on the basis of the slaughtering and processing functions, or on the basis of the combined functions of meat packing and wholesale distribution of the products. As meat-packing concerns also sell most of their products at wholesale, the separation of the cost of these functions involves some arbitrary allocations. This allocation, however, is customarily being made by the concerns as they are required to furnish information on meat packing and wholesale distribution separately to the Census of Business, and for other purposes.

### AVERAGE MARGIN FOR 1939

On the basis of meat-packing operations, the average gross margin in 1939 is estimated to have been 21.4 percent of the wholesale value of the product at the plant, according to information developed by the American Meat Institute (table 25) (1). This includes an operating margin of 20.2 percent and profit of 1.2 percent. In other words, 78.6 percent of the wholesale value of the products at the plant was paid for the livestock and other farm products purchased. The gross margin that year was about the same as the average gross margin for the 5-year

TABLE 25.—Division of the wholesale meat dollar based on the processing and wholesaling functions combined, and the processing function only, for the 5-year period 1936-40, and 1939<sup>1</sup>

Item	Meat packing and wholesaling functions combined		Meat packing function only	
	5-year average 1936-40	1939	5-year average 1936-40	1939
	Percent	Percent	Percent	Percent
Livestock cost .....	73.6	72.3	78.8	78.6
Gross margin .....	26.4	27.7	21.2	21.4
Payrolls .....	12.6	14.1	10.1	11.0
Supplies, containers, etc. ....	3.7	3.3	4.0	3.6
Miscellaneous processing costs....	3.5	2.7	3.7	3.0
Transportation and delivery.....	3.4	3.8	( <sup>2</sup> )	( <sup>2</sup> )
Taxes .....	.9	1.1	1.0	1.1
Depreciation .....	.9	1.0	1.0	1.0
Interest .....	.5	.5	.5	.5
Profits .....	.9	1.2	.9	1.2
Total .....	100.0	100.0	100.0	100.0

<sup>1</sup> Data on the division of the wholesale meat dollar for the 5-year period 1936-1940 published by American Meat Institute [I, p. 18] was used as a basis for estimating the division of costs for the processing function only for the same period, for estimating the division of costs for processing and wholesaling functions combined, and for the processing function only for 1939.

<sup>2</sup> The total cost of transportation and delivery is charged to the wholesaling function.

period, 1936-40. For performing the combined functions of meat packing and wholesale distribution of products, the average gross margin in 1939 was 27.7 percent of the wholesale value of the product of the plant, or at other points where the products were sold.

Reports of the wholesale meat-packing industry by the Census of Manufacture may also be used for determining margins. However, some adjustments need to be made in the reported figures before they are comparable with those reported by the Institute. According to the Census of Manufactures, which gives a composite statement of 1,478 meat-packing establishments for 1939, the average combined cost of materials (livestock), supplies, and containers amounted to 83.4 percent of the value of the products (table 26) (32). In order to derive a gross margin which is the difference between the total value of the product and the cost of the livestock and other farm products, it is necessary to deduct the estimated cost of supplies and containers from the combined cost of materials (livestock and meat), supplies and containers, and add this to the cost of processing. By doing so, the value of the purchased livestock can be ascertained.

If it is assumed that the cost of supplies and containers bought by packers in 1939 was 3.6 percent of the wholesale value of the products, as shown in table 25, the payment for livestock and other farm products

TABLE 26.—Value of Products: costs and margins by meat-packing establishments<sup>1</sup> in the United States, for years 1929, 1935, 1937, and 1939

VALUE OF PRODUCTS (DOLLARS)				
Item	1929	1935	1937	1939
	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars
Value of products.....	3,434,654	2,362,369	2,787,358	2,648,326
Cost of materials (livestock and meat), supplies and containers.....	2,953,979	2,013,307	2,367,932	2,207,487
Gross margin.....	480,675	349,062	419,426	440,839
Total classified.....	240,751	197,916	240,852	274,614
Salaries and wages.....	220,601	180,299	222,094	255,562
Fuel.....	13,942	10,504	10,645	10,564
Purchased electric energy.....	6,208	6,193	6,587	7,026
Contract work.....	.....	920	926	1,462
Total not classified <sup>2</sup> .....	239,924	151,146	178,574	166,225
Number of establishments.....	1,277	1,223	1,160	1,478

VALUE OF PRODUCTS (PERCENT)				
Item	1929	1935	1937	1939
	Percent	Percent	Percent	Percent
Value of products.....	100.0	100.0	100.0	100.0
Cost of materials (livestock and meat), supplies and containers.....	86.0	85.2	85.0	83.4
Gross margin.....	14.0	14.8	15.0	16.6
Total classified.....	7.0	8.4	8.6	10.3
Salaries and wages.....	6.4	7.7	8.0	9.6
Fuel.....	.4	.4	.4	.4
Purchased electric energy.....	.2	.3	.2	.2
Contract work.....	.....	( <sup>2</sup> )	( <sup>2</sup> )	.1
Total not classified <sup>2</sup> .....	7.0	6.4	6.4	6.3

<sup>1</sup> Includes depreciation, interest, insurance, rent, taxes, other expenses, and profits.

<sup>2</sup> Less than 0.05 percent.

Data abstracted from Bureau of the Census, Wholesale Distribution: 1929 (27); United Bureau of the Census, Biennial Census of Manufacturers, Part 1, 1937. (Processed); and Bureau of the Census, Manufactures: 1939 (32).

would have represented 79.8 percent of the finished products. The gross margin would then have been 20.2 percent of the value of the products compared with 21.4 percent as shown by the Institute. Meat-packing companies when reporting manufacturing costs to the Census of Manufactures were instructed to omit profits. If the average profit of 1.2 percent is added to the adjusted gross margin as reported by the Census, it will equal the gross margin shown by the study of the Institute of American Meat Packing.

A general comparison of the costs and margins for meat-packing establishments for the census periods 1929, 1935, 1937, and 1939 can also be made with the data in table 26. This indicates that the gross margin increased from one census period to the next, during the decade, although the figures for the different census years are not strictly comparable. In 1929, the average gross margin was reported to be 14.0 percent of the value of the products, compared with 16.6 percent in 1939. The increase in the margin was accounted for by the increased proportion of the expenses for salaries and wages. The proportions representing other items of cost were fairly constant for these periods.<sup>19</sup>

#### VARIATION IN MARGIN AMONG CONCERNS

The gross margin as shown by annual reports of several leading packing concerns varies considerably. An important difference is the ratio of cost of supplies and containers to the value of the product. This variation apparently is due primarily to the difference in the relative proportion of the different kinds of meat produced, and the extent to which the meat was processed and packaged. As a relatively larger proportion of the pork is normally processed than beef, veal, lamb, and mutton, the plants that produce pork products in large proportions would tend to show high operating margin. The principal processing supplies are, salt and other ingredients for curing meats and making sausage, and containers for sliced bacon, margarine, lard, soap, pharmaceuticals, and canned products. When meat is sold fresh, the supplies and containers required are relatively unimportant.

Processed meat is costly to prepare, primarily because of the labor involved, and the added cost of supplies and containers. Processing of meat will therefore increase the operating margin of packing concerns. The following tabulation gives an indication of the approximate range in cost of performing each of several main operations in meat-packing establishments:<sup>20</sup>

Operation:	Per 100 pounds
Killing and dressing beef .....	\$1.00 to \$1.50
Cutting and boning .....	.50 to 1.00
Curing .....	.50 to 1.00
Smoking, including packaging .....	1.50 to 2.00
Cooking, including boning, etc. ....	4.00 to 5.00
Sausage manufacture .....	5.00 to 7.00
Canning .....	5.00 to 10.00
Rendering, refining and packaging fats .....	1.25 to 1.50

<sup>19</sup> Data on the cost of operating meat-packing establishments may not be fully comparable for the different census periods, and there is no satisfactory way of making adjustments that will assure comparability. Some changes were made in the schedules, and there is the possibility that those who prepared the individual company reports may not have interpreted the instructions uniformly.

<sup>20</sup> Estimated and verified by members in the packing industry.

According to the Census of Manufactures, the average wholesale value per pound of processed meat produced by packing concerns in 1939 was higher than the average value of their fresh meat. The average values for some meats were as follows (32):

Kinds of meats:	Cents per pound
Fresh meat .....	13.3
Cured meat .....	15.5
Canned meat .....	19.2
Canned sausage .....	19.8
Sausage, other than canned .....	16.0

The products within each of the above groups also varied in value; for example, among the cured meats, pork, dry-salted (not smoked), sold at an average of 7.4 cents per pound; beef, pickled and other cured, 22.0 cents per pound; and cooked hams, 30.0 cents per pound.

#### ITEMS OF COST COMPRISING MARGIN

Pay rolls (salaries and wages) amounted to 11.0 percent of the value of the product, or 51.4 percent of the gross margin (table 25). Supplies, containers, etc., amounted to 3.6 percent of the value of the product, and miscellaneous processing costs 3.0 percent. Taxes, depreciation, and interest combined amounted to 2.6 percent, and profit 1.2 percent.

Pay rolls also accounted for about one-half of the gross margin of the combined functions of meat packing and wholesaling of meat performed by packing companies. Transportation and delivery of products, charged entirely to the function of wholesaling, comprised a substantial item of cost—3.8 percent of the wholesale value of the products. The distribution of the margin for the combined operations of meat-packing concerns in 1939 was not different from the average distribution for the 5-year period, 1936–40.

#### WAGES AND EFFICIENCY OF LABOR IN THE MEAT-PACKING INDUSTRY

Wage payments in the industry, as measured both by the average hourly earning and by the average weekly earning, have more than doubled since 1933. The average hourly earning in 1933 was 46.2 cents; in 1939 it was 68.6 cents; and in 1944 it reached 92.1 cents (table 27) (34). The average weekly earning was \$20 in 1933, \$27.85 in 1939, and \$45.42 in 1944.

The increase in weekly earnings had three important causes: increase in basic wage rates, decrease in basic working hours per week, and increase in payments for overtime work which was paid for at higher rates per hour than the base rate. The average number of hours worked per week decreased from 1932 to 1934, remained fairly constant to 1942, and then the working hours per week increased sharply. The increase in the length of the working week in 1943 and 1944 was due to the shortage of labor during the war. As a large volume of livestock was slaughtered in those years, and the labor supply was short, overtime payments in the packing plants increased.

Although the meat-packing margin has increased, the rate of increase has been proportionately less than the increase in the wage rates during the period 1919–44. Some operating costs were relatively fixed and others

TABLE 27.—Average hours and earnings in the slaughtering and meat-packing industry, 1932-44

Year	Average hours worked per week	Average hourly earnings	Average weekly earnings
		Cents	Dollars
1932	46.3	46.5	21.61
1933	43.3	46.2	20.00
1934	40.8	52.8	21.93
1935	40.4	55.9	22.84
1936	43.2	56.5	23.89
1937	41.0	66.5	27.27
1938	41.0	68.8	28.10
1939	40.6	68.6	27.85
1940	40.1	68.6	27.60
1941	39.6	74.1	29.35
1942	40.9	80.8	33.02
1943	46.5	87.2	40.43
1944	49.5	92.1	45.42

United States Bureau of Labor Statistics (34, p. 1097). Data for 1942-44 from Bureau of Labor Statistics (Unpublished).

increased relatively less than did labor. The efficiency of labor also increased during the period, as shown by the output per man-hour (table 28). The volume of output per man-hour index in 1919 (base 1939 equals 100) was 58.8, in 1929 it was 79.1; and in 1933 it was 91.6. The index reached the high point of 102.3 in 1944.

TABLE 28.—The volume of output per wage earner and per man-hour, and the unit labor cost of output in the meat-packing industry, 1919-44  
[Index 1939 = 100]

Year	Production volume	Employment	Man-hours	Output per—		Payrolls	Unit labor cost
				Wage earner	Man-hour		
1919	86.8	126.0	147.7	69.0	58.8	123.0	141.7
1920	80.4	110.2	129.4	72.9	62.1	120.3	149.7
1921	75.6	92.6	105.2	81.7	71.8	90.9	120.4
1922	82.7	91.1	108.4	90.9	76.3	84.9	102.6
1923	93.7	105.2	126.6	89.1	74.0	100.1	106.8
1924	96.1	101.1	121.1	95.2	79.4	97.9	101.9
1925	89.8	96.0	115.2	93.6	78.0	95.9	106.8
1926	92.2	94.2	113.6	97.9	81.1	96.1	104.3
1927	92.1	95.0	115.4	97.0	79.7	97.1	105.5
1928	93.9	96.1	117.7	97.8	79.7	98.6	105.1
1929	95.3	98.3	120.5	97.0	79.1	100.3	105.3
1930	92.7	94.2	114.0	98.4	81.2	95.6	103.2
1931	91.3	86.5	102.7	105.6	89.0	82.0	89.9
1932	86.7	83.3	97.1	104.1	89.2	65.9	76.1
1933	92.1	92.6	100.4	99.4	91.6	69.2	75.2
1934	93.8	113.4	114.8	82.7	81.7	94.6	100.8
1935	78.8	96.4	95.9	81.9	82.2	84.2	106.8
1936	92.4	103.0	107.2	89.7	86.2	91.9	99.5
1937	89.2	105.4	106.5	84.7	83.8	104.8	117.5
1938	94.8	99.8	100.8	95.0	94.0	101.4	107.1
1939	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1940	110.2	109.0	107.9	101.1	102.1	108.1	98.1
1941	117.9	119.4	116.5	98.7	101.2	127.1	107.8
1942	138.3	142.9	144.0	96.8	96.0	170.5	123.3
1943	151.7	136.6	156.5	111.1	96.9	200.1	131.9
1944	162.8	130.6	159.2	124.7	102.3	216.1	132.7

United States Bureau of Labor Statistics (34, p. 1095). Data for 1941-44 from United States Bureau of Labor Statistics, Productivity and Unit Labor Cost in Selected Manufacturing Industries, 1939-44, p. 6, May 1945. (Processed.)

The unit labor cost of production has varied from year to year but there was no appreciable increase in the trend between 1922 and 1941.

The index of production and the index of pay rolls have followed about the same trends. This indicates that the efficiency of the labor employed during that period increased at about the same rate as the increase in wage payments. Year-to-year fluctuations in unit labor cost were caused either by variation in the volume of production or by changes in wage rates. Since 1941, pay rolls have increased considerably more than production; hence the unit labor cost has risen sharply, reaching an index of 132.7 in 1944. The number of wage earners in the industry increased during this period but the output per man-hour decreased from an index of 101.2 in 1941 to 96.9 in 1943, but rose to 102.3 in 1944.

When the cost of labor per unit of output increases it may be offset by the industry in one of three ways: (1) Lower prices may be paid for livestock, (2) higher prices may be received for meat and other products, or (3) smaller profits may accrue to the industry. Of these, except for temporary periods, reduction in the price paid for livestock is the most probable.

The increase in the efficiency of labor employed in this industry was brought about primarily by the greater use of machinery for performing many of the processing operations, by improving the quality of the machines, and by redesigning plants to eliminate lost motion. The use of power trucks for moving meat and other products between departments have reduced the labor and made these tasks less strenuous.

Mechanization is being applied to a greater extent in the slaughtering and processing of pork than of beef, veal, mutton, and lamb. This involves improvement in the machines and equipment invented long ago, as well as the development of new machines and new processes. Machines for cleaning and dehairing hog carcasses have been greatly improved. Power saws and mechanical knives have replaced hand saws and ordinary knives in the cutting rooms to a considerable extent. The development of new machines and the improvement of old ones have saved labor in making sausage and other prepared meats, and in making lard and other shortenings. Refrigeration systems have been improved and this has speeded up the chilling process and reduced shrinkage in the cooler. Special ultra-violet lamps have been installed in coolers to protect meat from mold and bacteria when held at temperatures which tenderizes meat at a more rapid rate. New techniques of curing and smoking meat that require less time have been developed; they have not only speeded the process but have also decreased losses resulting from shrinkage and surface spoilage.

The specialization of jobs in the plant and the introduction of incentive-payment plans have also increased the productivity of labor. The most common incentive plan in this industry is the production-bonus system of wage payments. In a study made in 1937, it was found that nearly one-fourth of the workers included were employed on this basis (34). The production-bonus workers were employed in 40 of the 1,600 establishments included in the study by the Bureau of Labor Statistics. The straight-time plan, which guarantees to employees 52 equal weekly wage payments in return for a predesignated volume of work for the year, has been tried with some success. The primary purpose of this plan is to stabilize employment and to hold to a minimum the loss of skilled workmen to other industries.

PROFITS IN THE MEAT-PACKING INDUSTRY

Profits or earnings of the wholesale meat-packing industry are small per unit of product. However, as the aggregate volume and the total value of the products handled are large, the average return on investment has been more favorable than the narrow profit margin on sales would suggest. The earnings reported by packers are for their entire operations and include the income from all sources, such as poultry, eggs, butter, cheese, shortening, and various other products and byproducts as well as from meat. Profits also include their wholesaling operations and their slaughtering and processing operations. The unit margin on meat-packing operations alone probably are smaller than from the handling of some other products and from some of the other operations performed by meat packers.

TABLE 29.—Profits of slaughtering and nonslaughtering meat-packing concerns based on net worth and on sales, 1925-43

SLAUGHTERING CONCERNS

Year	Concerns reporting	Net worth	Sales	Profit <sup>1</sup>	Profit on net worth <sup>1</sup>	Profit on sales <sup>1</sup>
	Number	1,000 Dollars	1,000 Dollars	1,000 Dollars	Percent	Percent
1925	339	823,714	3,464,982	46,611	5.7	1.3
1926	383	840,474	3,402,992	42,867	5.1	1.3
1927	406	827,945	3,490,907	18,795	2.3	.5
1928	467	829,632	3,665,768	48,175	5.8	1.3
1929	587	855,415	3,848,119	39,906	4.7	1.0
1930	686	887,119	3,627,783	32,463	3.7	.9
1931	670	835,362	2,770,048	<sup>2</sup> -17,945	<sup>2</sup> -2.1	<sup>2</sup> -6
1932	626	781,036	1,960,564	<sup>2</sup> -6,457	<sup>2</sup> -.8	<sup>2</sup> -.3
1933	629	765,712	1,867,461	26,392	3.4	1.4
1934	608	726,018	2,284,978	36,054	5.0	1.6
1935	614	697,352	2,784,939	37,176	5.4	1.3
1936	589	708,249	3,021,293	32,929	4.6	1.1
1937	585	712,489	3,297,503	21,776	3.1	.7
1938	595	700,501	3,044,648	<sup>2</sup> -3,999	<sup>2</sup> -.6	<sup>2</sup> -.1
1939	621	700,137	3,075,462	37,126	5.3	1.3
1940	604	721,473	3,158,345	42,197	5.8	1.3
1941	623	736,403	4,065,713	64,610	8.7	1.6
1942	616	779,348	5,780,817	67,341	8.6	1.2
1943	641	783,108	6,180,729	71,840	9.2	1.2

NONSLAUGHTERING CONCERNS

1925	175	116,554	343,006	17,947	15.4	5.2
1926	197	149,442	346,876	16,162	10.8	4.7
1927	205	142,827	377,889	19,502	13.7	5.2
1928	213	154,074	433,119	22,029	14.3	5.1
1929	215	164,565	447,230	25,836	15.7	5.8
1930	259	171,821	377,734	17,533	10.2	4.6
1931	257	221,805	288,857	4,758	2.1	1.6
1932	242	160,011	226,336	<sup>2</sup> -1,440	<sup>2</sup> -.9	<sup>2</sup> -.6
1933	242	155,990	216,231	7,803	5.0	3.6
1934	233	156,534	258,033	9,725	6.2	3.8
1935	241	155,187	305,331	12,008	7.7	3.9
1936	226	181,213	396,255	19,004	10.5	4.8
1937	223	158,965	362,768	11,098	7.0	3.1
1938	220	154,254	354,333	6,008	3.9	1.7
1939	209	142,387	351,850	15,428	10.8	4.4
1940	217	136,945	406,272	20,289	14.8	5.0
1941	206	141,731	477,780	23,305	16.4	4.9
1942	199	156,397	599,025	20,937	13.4	3.5
1943	197	142,567	518,710	16,147	11.3	3.1

<sup>1</sup> After payment of interest and taxes.

<sup>2</sup> Loss.

From annual reports of meat packing concerns submitted to the United States Department of Agriculture in connection with the administration of the Packers and Stockyards Act.



In 1939, total sales of 621 meat-packing companies that slaughtered, aggregated \$3,075,462,000 (table 29).<sup>21</sup> Total net profits (after taxes and interest) were \$37,126,000 or 1.2 cents per dollar of sales. Net worth of these companies was placed at \$706,137,000. Earnings on net worth that year amounted to 5.3 percent. Net profits were ascertained by deducting from gross earnings the payment of all expense of operation, interest, depreciation, reserves, and taxes.

The meat-packing industry made profits in 16 out of the 19 years during the period 1925-43. Losses were incurred in 3 years during that period. Based on sales, net returns ranged from 0.6-percent loss in 1931 to 1.6-percent profit in 1941. Returns on net worth ranged from a loss of 2.1 percent in 1931 to a net profit of 9.2 percent in 1943. Obviously, net earnings or profits in any given year varied considerably among individual concerns. Some concerns are likely to have losses in good years, and other concerns will make profits when the industry as a whole shows a loss. Of the 910 meat-packing corporations submitting reports for Federal income purposes to the United States Bureau of Internal Revenue for 1939, 563 corporations reported net incomes (profits) and 347 reported no net incomes (no profits) (33).

The rate of earnings of nonslaughtering packing concerns for a period in the past has averaged considerably higher than for the packing concerns that slaughter. In only 1 year in a period of 19 years did this group of concerns show loss instead of gain. That was in 1932 when the loss was 0.9 percent, based on net worth. Net profit based on net worth in the other years ranged from an average of 2.1 percent in 1931 to 16.4 percent in 1941. Average returns on sales ranged from a loss of 0.6 percent in 1932 to a profit of 5.8 percent in 1929. In 1939, the year used as a base in this study, the net profit based on net worth was 10.8 percent, and on sales 4.4 percent.

Net profits of packing concerns per hundredweight of livestock, or per hundredweight of dressed meat, are small on the average. In 1939, the average net profit per hundredweight of livestock was 15 cents, and per hundredweight of dressed meat 24 cents (table 30). Since 1925, the highest annual average net profit per unit of product was in 1941, namely 36 cents per hundredweight of dressed meat. The margin per unit was nearly as high in 1942 and 1943. The greatest average loss—12 cents per hundredweight of dressed meat—occurred in 1931. Losses were also incurred by industry in 1932 and 1938.

The average profit of meat-packing concerns that slaughter, classified according to their kind of operation and size of business, for the 5 years, 1936-40, may be noted in table 31. In 1939, the 4 largest general packing concerns made a total profit of \$21,872,000. This was equal to an average profit of 4.4 percent on net worth, and 1.1 percent on sales. The 6 packing companies with net worth ranging from \$4,000,000 to \$20,000,000 had the highest profits of any group, namely 9.7 percent of net worth and 1.9 percent on sales. In general, the packers that handled only one species of livestock that year had average profits that were lower than those of the general packers. In 1938, some groups of meat packers had losses whereas other groups made profits. A large

<sup>21</sup> Summary of reports submitted by meat-packing concerns to the United States Department of Agriculture in connection with the administration of the Packers and Stockyards Act.

packing company that operates several plants will probably find that earnings of individual plants vary considerably. Some may make profit and others may incur losses within the same year.

TABLE 30.—Average profit per 100 pounds of livestock and of dressed meat received by meat-packing concerns doing slaughtering, 1925-43

Year	Concerns reporting Number	Average profit per 100 pounds of—	
		Livestock <sup>1</sup> Cents	Dressed meat <sup>1</sup> Cents
1925	339	20	32
1926	383	18	29
1927	406	8	13
1928	467	20	32
1929	587	17	26
1930	686	14	23
1931	670	2-8	2-12
1932	626	2-3	2-5
1933	629	11	17
1934	608	15	24
1935	614	19	32
1936	589	14	23
1937	585	10	16
1938	595	2-2	2-3
1939	621	15	24
1940	604	15	24
1941	623	22	36
1942	616	21	34
1943	641	21	34

<sup>1</sup> After payment of interest and taxes.

<sup>2</sup> Loss.

Based on consolidated reports of meat-packing concerns filed with the United States Department of Agriculture in connection with the administration of the Packers and Stockyards Act. From American Meat Institute (*l. p. 35*). Data for 1941-43 from American Meat Institute (Unpublished).

Incomes to nonslaughtering concerns reporting to the United States Department of Agriculture, are classified into 4 size-groups, for the 5-year period 1936-40 (table 32). The smallest group had net worth under \$1,000,000 and the largest group had net worth over \$20,000,000. Large nonslaughtering concerns were relatively few, as more than 93 percent had net worth under \$1,000,000.

The average earnings for each of the nonslaughtering packing groups showed a profit every year during this period. The larger concerns generally had higher average profits than the smaller ones. For concerns in the group with net worth over \$20,000,000, profits based on net worth ranged from an average of 2.2 percent in 1938 to 21.0 percent in 1940. Earnings for the group with net worth from \$4,000,000 to \$20,000,000 varied from an average of 7.5 percent in 1938 to 11.1 percent in 1937. Concerns with net worth under \$1,000,000 had average profits based on net worth from 3.9 percent in 1936 to 7.4 percent in 1939. Average profits on sales for the group of the largest nonslaughtering packers ranged from 1.7 percent in 1938 to 13.6 percent in 1940. Concerns with net worth under \$1,000,000 had average profits that varied from 0.8 percent in 1936 and to 1.4 percent in 1939. Information is not available as to what business other than meat packing the nonslaughtering packers engaged in, but it is probable that the high profits of these concerns may have been partly contributed by such other business.

That processing operations are more remunerative on an average than slaughtering operations is the conclusion drawn from a comparison of

TABLE 31.—Number, average net worth, sales, and profits of meat-packing concerns slaughtering livestock, classified by kind of operation and size, 1936-40

Kind of operation and net worth	Concerns					Sales					Profit on net worth				
	1936	1937	1938	1939	1940	1936	1937	1938	1939	1940	1936	1937	1938	1939	1940
	Number	Number	Number	Number	Number	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	Percent	Percent	Percent	Percent	Percent
General packers:															
\$20,000,000 and over.....	4	4	4	4	5	2,003,607	2,148,129	1,043,902	1,920,209	2,068,012	4.9	3.8	-1.6	4.4	5.2
\$4,000,000 to \$20,000,000.....	6	6	6	6	6	285,599	317,139	302,580	310,748	264,148	3.9	-3	2.8	9.7	9.7
\$1,000,000 to \$4,000,000.....	22	24	21	22	23	182,612	220,780	193,187	191,419	177,643	5.0	1.1	5.8	5.1	5.7
Under \$1,000,000.....	306	316	333	355	340	297,997	336,669	340,835	367,274	373,048	3.5	2.6	4.2	8.4	7.2
Pork packers:															
\$1,000,000 and over.....	12	10	9	9	9	75,391	70,841	58,430	65,731	60,696	1.5	-1.8	-2.8	8	9.4
Under \$1,000,000.....	44	34	36	39	35	52,853	52,835	54,863	59,833	44,285	6	8	-1.8	7.6	10.5
Beef packers: Under \$1,000,000.....	77	73	68	75	77	55,397	66,548	73,559	78,573	86,720	8.6	9.8	-6.6	6.1	7.2
Mutton packers: Under \$1,000,000.....	6	7	6	4	5	350	367	316	2,218	2,924	8.3	9.5	6.4	6.3	16.6
Beef and mutton packers: Under \$1,000,000.....	112	111	112	107	104	67,487	84,195	76,877	79,457	80,869	7.0	3.0	2.2	6.6	4.8
Total.....	589	585	595	621	604	3,021,293	3,297,503	3,044,648	3,075,462	3,158,345	4.6	3.1	-6	5.3	5.8

Kind of operation and net worth	Net worth <sup>1</sup>					Net profits					Profit on sales				
	1936	1937	1938	1939	1940	1936	1937	1938	1939	1940	1936	1937	1938	1939	1940
	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	Percent	Percent	Percent	Percent	Percent
General packers:															
\$20,000,000 and over.....	501,453	504,176	495,773	496,687	526,921	24,800	19,325	-7,933	21,872	27,217	1.2	0.9	-0.4	1.1	1.3
\$4,000,000 to \$20,000,000.....	57,389	60,553	60,597	59,902	48,266	2,265	-198	1,671	5,829	4,669	.8	-1	.6	1.9	1.8
\$1,000,000 to \$4,000,000.....	46,211	48,544	43,850	42,680	43,581	2,332	522	256	2,165	2,468	1.3	2	1	1.1	1.4
Under \$1,000,000.....	58,144	58,372	60,621	63,138	63,211	2,038	1,535	2,530	5,281	4,531	.7	.5	.7	1.4	1.2
Pork packers:															
\$1,000,000 and over.....	19,871	17,526	15,868	16,875	15,500	300	-311	-439	130	1,456	.4	-.4	-.8	.2	2.4
Under \$1,000,000.....	10,337	8,599	9,350	10,645	8,893	57	65	-77	813	936	1	1	1	1.4	2.1
Beef packers: Under \$1,000,000.....	5,947	5,806	5,280	7,335	6,512	511	567	-35	449	471	.9	.9	1	.6	.5
Mutton packers: Under \$1,000,000.....	108	105	94	269	302	9	10	6	17	50	2.6	2.7	1.9	.8	1.7
Beef and mutton packers: Under \$1,000,000.....	8,789	8,808	9,068	8,606	8,287	617	261	22	570	399	.9	.3	.7	.7	.5
Total.....	708,249	712,489	700,501	706,137	721,473	32,929	21,776	-3,999	37,126	42,197	1.1	.7	-.1	1.2	1.3

<sup>1</sup> The net worth used is the average of the net worth at the beginning and close of the year.

<sup>2</sup> Less than 0.05 percent.

From consolidated annual reports of meat-packing concerns filed with the United States Department of Agriculture in connection with the administration of the Packers and Stockyards Act.

TABLE 32.—Number, average, net worth, sales and profits of nonslaughtering meat-packing concerns classified by size, 1936-40

Kind of operation and net worth	Concerns					Net profit				
	1936	1937	1938	1939	1940	1936	1937	1938	1939	1940
	Number	Number	Number	Number	Number	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars
Over \$20,000,000.....	3	2	2	2	2	14,122	4,773	1,782	10,315	14,314
From \$4,000,000 to \$20,000,000.....	3	5	3	3	3	2,924	3,410	2,325	2,637	3,340
From \$1,000,000 to \$4,000,000.....	11	11	8	8	5	880	1,379	657	540	612
Under \$1,000,000.....	200	207	207	198	206	1,672	1,530	1,244	2,030	2,114
Total.....	226	223	220	208	217	18,004	11,098	6,008	15,428	20,280

Kind of operation and net worth	Net worth <sup>1</sup>					Profit on net worth				
	1936	1937	1938	1939	1940	1936	1937	1938	1939	1940
	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	Per cent	Per cent	Per cent	Per cent	Per cent
Over \$20,000,000.....	104,114	80,475	79,996	73,897	69,306	13.6	5.9	2.2	14.0	21.0
From \$4,000,000 to \$20,000,000.....	29,001	30,855	30,826	30,985	32,203	10.1	11.1	7.5	8.4	10.4
From \$1,000,000 to \$4,000,000.....	20,882	19,908	15,227	10,938	7,594	4.2	6.9	4.3	5.0	8.7
Under \$1,000,000.....	27,236	27,737	28,265	27,467	28,842	3.9	5.5	4.4	7.4	7.3
Total.....	181,233	158,965	154,254	142,387	130,945	10.5	7.0	3.9	10.8	14.8

Kind of operation and net worth	Sales					Profit on sales				
	1936	1937	1938	1939	1940	1936	1937	1938	1939	1940
	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	1,000 dollars	Per cent	Per cent	Per cent	Per cent	Per cent
Over \$20,000,000.....	154,976	89,040	103,719	113,328	105,108	0.1	5.3	1.7	9.1	13.6
From \$4,000,000 to \$20,000,000.....	57,618	59,717	58,670	63,201	112,934	5.7	0.0	4.0	4.0	3.0
From \$1,000,000 to \$4,000,000.....	51,443	55,785	39,632	27,705	17,762	1.7	2.5	1.7	2.0	2.9
Under \$1,000,000.....	138,318	100,626	152,312	147,558	170,468	.8	1.0	.8	1.4	1.2
Total.....	306,255	302,768	354,333	351,850	406,272	4.8	3.1	1.7	4.4	5.0

<sup>1</sup> The net worth used is the average of the net worth at the beginning and close of the year. From consolidated annual reports of meat-packing concerns filed with the United States Department of Agriculture in connection with the administration of the Packers and Stockyards Act.

the profits of nonslaughtering and slaughtering concerns. The fact that packers who slaughter livestock for their own account also do more or less processing apparently is to their advantage. Furthermore, the amount of processing done by individual slaughtering concerns varies. It also varies among individual plants operated by the same concern. The relationship between the amount of processing done by a slaughtering concern and its profit cannot be ascertained from the data available in this study.

### MARGIN AND COSTS FOR WHOLESALING MEAT

Wholesale distribution of meat involves the sale of products in relatively large volume. A large proportion of the meat sold wholesale goes to retail dealers who, in turn, sell to consumers in small quantities. Meat generally bought for the hotel, restaurant, and steamship trade is obtained in wholesale and jobbers' markets—usually hotel supply houses, Packers

also sell considerable quantities of fresh meat to special processors for making sausage and other prepared meats. Although packing concerns sell at wholesale most of the meat they produce, the cost of marketing meat at wholesale is being considered in this report separately from the cost of slaughtering and processing.

Beef is generally sold at wholesale in quarters, although some is sold as whole carcasses, or as wholesale cuts. Veal and lamb are mostly sold as carcasses, but pork is sold as packer sides or wholesale cuts. Fresh edible byproducts are sold wholesale in suitable containers. Sliced bacon and rendered lard may be put up in consumer-size packages at the packing or other processing plant and sold to retailers in wholesale quantities.

Fresh meat, being highly perishable, is usually moved quickly under refrigeration, and is handled carefully to prevent deterioration. Cured, canned, and other processed products are not so perishable, and some are transported and distributed without refrigeration. The fact that large quantities of fresh perishable meat products are consumed in areas widely separated from the place of slaughter and processing increases the problem of transportation and distribution.

#### METHODS OF OPERATION AND SERVICES PERFORMED

The wholesale distribution of meat is largely carried on by meat-packing concerns and by nonslaughtering processors. The sale of meat by packers may be made through the wholesale departments at the packing plants, through the packer's branch houses, by car routes, by truck routes, and through jobbers and brokers. A packer may employ several of these methods. Local packers generally use the wholesale market at the plant for disposing of most of their meat. If they distribute to other communities they may also operate truck routes. Regional and national packers, in addition to distributing meat from the wholesale department at their plants, sell through their own branch houses, by car routes, and by truck routes.

#### VARIOUS METHODS OF WHOLESALING

When meat is distributed from the wholesale department at the packing plant the dealer generally makes his selection at the cooler but to some extent he orders meat by means of telephone. By selecting meat after examination a dealer is more likely to obtain the kind of product he wants. This apparently is not so important as it used to be, however, because more of the meat is now graded and stamped by official graders and the dealer is assured of reasonable uniformity in quality when he buys according to grade. Some meat also is sold under the packer's brand which indicates the quality.

Branch houses are usually found in cities having a population of 50,000 or more. Most of them are operated by the larger packing concerns. The four largest packing concerns had a total of 826 branch houses in 1939 (36). This is a substantial reduction from the 1,000 branch houses operated by the five large packers of 1916 (5). Several other relatively large packers who distribute over wide areas operate some branch houses. The proportion of the products marketed through branch

houses, as well as the number of branch houses, was decreasing before World War II, and larger proportions of the products were being distributed by means of truck routes and car routes.

Branch houses receive their products from packing plants in the form of carcasses, sides and quarters of carcasses, wholesale cuts, and other packing-house products, usually in carlots. The meat is transported from the packing plant to the branch house in refrigerator cars, or in refrigerator motortrucks. Each branch house has its own manager, office force, sales and delivery organization. The method of selling at a branch house is rather similar to that employed at the wholesale market at a packing plant. The retail dealer may visit the branch-house cooler to select his products, or he may place his order by telephone or with the packer salesman who calls at his store. Some processing may be done also at a branch house.

The car-route system is designed to supply dealers in the smaller cities, towns, and villages along railroad lines with packing-house products in less than carlot shipments. Refrigerator cars are loaded at the packing plant and moved over established routes at scheduled periods. Stops are made at designated towns for unloading the products perviously ordered by dealers.

Truck routes have replaced car routes to a considerable extent in recent years. Sale is mostly to retail dealers in town and cities. Motor-truck transportation has certain advantages over rail distribution of meat in that definite routes and schedules do not need to be followed, and deliveries can be made directly from the packing plant to the retail store instead of at a railroad station. In addition, there is the so-called paddler truck operated by a driver-salesman who sells in small quantities from a stock carried in the truck.

Wholesalers, jobbers, and agents or brokers sell mostly to retail meat dealers, restaurants, hotels, and institutions. Packers who do not have branch houses, or who do not operate car routes or truck routes, may sell some of their products through wholesalers and jobbers. This method of distribution is also used by a packer for disposing of products in a city where he does not maintain a branch house, or which is not serviced by a car route or a truck route. Such agents or brokers distribute the product from the refrigerator car to retailers and other wholesale buyers.

About one-fourth of the 1,064 nonslaughtering establishments reported by the Census of Business in 1939 were operated by meat-packing companies that slaughter and three-fourths by other concerns (table 33) (30). The slaughtering meat packers who also operate nonslaughtering processing plants may distribute the products from all their plants through the same outlets. Ninety-two percent of the products of all packing concerns (slaughtering and nonslaughtering), having a combined value of \$2,893,616,000 in 1939 were produced in and distributed from the slaughtering plants.

#### WHOLESALE BY LARGE PACKING CONCERNS

The methods of distributing meat and meat products by 8 important packing companies in 1935 was reported by the Federal Trade

Commission.<sup>22</sup> These concerns were among the largest in the country, and operated a total of more than 90 plants. All the companies distributed products over wide areas, and several nationally. Compared with the total production in federally inspected plants in 1935, the output of these 8 packing concerns accounted for approximately 66 percent of the fresh beef carcasses and cuts, about 80 percent of the production of fresh veal carcasses and cuts, and about 62 percent of the pork, including fresh pork carcasses and cuts, cured, and processed pork (table 34). These packing companies operated a large number of branch houses, whereas relatively few branch houses were being maintained by the other concerns in the industry.

TABLE 33.—Wholesale distribution of sales of meats and meat products by packing plants and other establishments in the United States, 1939

Item	Meats and meat products—in meat-packing establishments		Miscellaneous meats—not made in meat-packing establishments				Total all meats	
	Value	Percent	Operated by meat-packing companies		Operated by other concerns		Value	Percent
			Value	Percent	Value	Percent		
	<i>1,000 dollars</i>		<i>1,000 dollars</i>		<i>1,000 dollars</i>		<i>1,000 dollars</i>	
Total distributed sales.....	2,666,175	100.0	78,046	100.0	149,395	100.0	2,893,616	100.0
To or through manufacturer's owned and operated outlets:								
Wholesale branches or offices.....	789,892	29.6	60,639	77.7	5,719	3.8	856,250	29.6
Retail stores.....	21,503	.8			8,211	5.5	29,714	1.0
To other business concerns in the United States for resale:								
Wholesalers and jobbers.....	418,443	15.7	3,891	5.0	34,393	23.0	456,727	15.8
Export intermediaries.....	19,783	.4	1622	.8	245	.2	11,650	.4
Retailers (including chains).....	1,181,178	44.4	9,704	12.4	90,873	60.8	1,284,755	44.4
Export, direct to buyers in other countries.....	38,947	1.5			72	*	39,019	1.4
To users and consumers:								
Industrial, etc., users <sup>1</sup> .....	192,762	7.2	2,968	3.8	7,435	5.0	203,165	7.0
Consumers at retail <sup>2</sup> .....	9,667	.4	222	.3	2,447	1.7	12,336	.4
Number of establishments.....	1,471		259		895		2,535	

<sup>1</sup> Direct export sales combined with sales to export intermediaries to avoid disclosure.

<sup>2</sup> Less than one-tenth of 1 percent.

<sup>3</sup> Also includes commercial, professional, and industrial users (manufacturers, railroads, utilities, Government bodies, hotels, contractors, etc.).

<sup>4</sup> Includes farmers, household consumers, and employees at retail.

United States Bureau of the Census (30, p. 19).

Distribution by the eight concerns to retail establishments (independent and chain retail meat markets, and combination grocery and meat stores) accounted for 84 percent of their fresh beef, about 89 percent of their fresh veal, more than 83 percent of their fresh pork, and nearly 78 percent of their cured and processed pork. Independent meat markets and grocery stores were by far the most important outlets. Sales to retail

<sup>22</sup> These packing companies were: Swift & Co., Armour & Co., Wilson & Co., Inc., The Cudahy Packing Co., John Morrell & Co., Kingan & Co., Inc., George A. Hormel & Co., and Jacob Doid Packing Co. Reported by United States Federal Trade Commission (40 pp. 1017-1022).

TABLE 34.—Sales of fresh beef, veal, and pork carcasses and cuts, and cured and processed pork, including edible pork offal, of eight meat-packing companies<sup>1</sup>, by channels of distribution, fiscal year, 1935<sup>2</sup>

Channels of distribution	Sales of fresh beef, veal, and pork carcasses and cuts, and cured and processed pork including edible pork offal <sup>3</sup>									
	Fresh carcasses and cuts						Cured and processed pork and edible pork offal <sup>3</sup>		Total meat	
	Beef		Veal		Pork		Pounds	Percentage of total	Pounds	Percentage of total
	Pounds	Percentage of total	Pounds	Percentage of total	Pounds	Percentage of total				
	Percent		Percent		Percent		Percent		Percent	
Wholesale grocers.....	19,795,160	0.66	2,318,257	0.48	5,112,849	0.50	21,486,597	1.25	48,712,863	0.78
Brokers and commission houses.....	76,877,358	2.56	5,107,583	1.06	17,167,815	1.66	41,553,288	2.42	140,706,044	2.26
Wholesale meat dealers and jobbers.....	242,311,469	8.05	23,276,707	4.85	57,645,190	5.59	103,310,399	6.01	426,543,765	6.84
Hotels, restaurants, hospitals, and institutions.....	58,043,729	1.93	8,470,252	1.76	14,649,505	1.42	45,214,955	2.63	126,378,441	2.03
Cooperative and voluntary chains.....	176,088,747	5.85	17,528,919	3.65	23,582,167	2.29	85,569,887	4.98	302,769,720	4.85
Combination grocery and meat chains.....	325,927,980	10.84	35,662,997	7.42	68,144,848	6.60	186,483,976	10.84	616,219,801	9.88
Independent retail meat markets and grocery stores.....	2,024,509,181	67.31	374,602,906	78.00	768,949,699	74.53	1,065,344,296	61.96	4,233,406,082	67.85
Meat packing companies (not owned or controlled by reporting companies).....	22,601,324	.75	1,812,570	.38	11,673,254	1.13	44,626,755	2.60	80,713,903	1.29
Federal, State, and local Governments.....	49,158,340	1.63	9,932,392	2.07	13,876,639	1.35	33,936,645	1.97	106,904,006	1.71
Exported.....	3,839,688	.13	411,969	.09	47,848,117	4.64	83,952,124	4.88	136,051,898	2.18
All other consumers and distributors <sup>4</sup> .....	8,776,508	.29	1,156,650	4.24	3,019,261	.29	7,938,395	.46	20,890,814	.33
Total sales.....	3,007,929,484	100.00	480,281,202	100.00	1,031,669,334	100.00	1,719,417,317	100.00	6,239,297,337	100.00

<sup>1</sup>Includes the following companies and their domestic subsidiaries (3 companies reported inconsequential sales through foreign branches). Swift & Co., Armour & Co., Wilson & Co., Inc., The Cudahy Packing Co., John Morrell & Co., Kingan & Co., Inc., George A. Hormel & Co., and Jacob Dold Packing Co.

<sup>2</sup>Fiscal years ended on Oct. 26 to Nov. 2, 1935.

<sup>3</sup>Includes cured, smoked, and canned pork products, and edible pork offal, including trimmings, hearts, tongues, and livers.

<sup>4</sup>Includes sales to railroad, steamship, and other commissaries, soup manufacturers, baking companies, and miscellaneous consumers and distributors.

United States Federal Trade Commission (35, p. 1018).



stores by these eight packing concerns (including sales through their branch houses) represented about 83 percent of all the meat they sold. This compares with 70 percent for all packing concerns in the United States, as reported by the census (see fig. 2, page 8). Of the total value of the meat and meat products distributed by these concerns, 6.8 percent was distributed through wholesale meat dealers and jobbers. Exports of fresh, cured, and processed pork comprised nearly 5 percent of the total, but the export of fresh beef and veal was negligible. Rela-

TABLE 35.—Sales of lard, edible oleo and tallow, and miscellaneous beef, veal, and pork products, of eight meat-packing companies<sup>1</sup>, by channels of distribution, fiscal year 1935<sup>2</sup>.

Channels of distribution	Sales of lard, edible oleo and tallow, and miscellaneous beef, veal, and pork products					
	Lard <sup>3</sup>		Edible oleo and tallow <sup>4</sup>		Miscellaneous beef, veal, and pork products <sup>5</sup>	
	Pounds	Per-centage of total	Pounds	Per-centage of total	Pounds	Per-centage of total
		<i>Percent</i>		<i>Percent</i>		<i>Percent</i>
Wholesale grocers	16,088,118	2 70	1,897,192	1 24	9,817,424	0 82
Brokers and commission houses	9,334,464	1 56	38,853,566	25 48	65,851,017	5 48
Wholesale meat dealers and jobbers	17,918,267	3 00	2,647,910	1 74	26,068,128	2 17
Hotels, restaurants, hospitals and institutions	25,504,905	4 27	1,280,541	81	5,556,220	.46
Cooperative and voluntary chains	17,439,181	2 92	2,345,810	1 51	43,617,006	3 61
Combination grocery and meat chains	40,000,936	6 70	3,701,932	2 43	89,210,948	7 32
Independent retail meat markets and grocery stores	331,187,193	55 17	19,804,387	12 99	541,553,586	45 05
Meat-packing companies (Not owned or controlled by reporting companies)	19,599,429	3 28	4,874,218	1 89	15,083,635	1 25
Baking and biscuit companies	35,363,737	5 92	35,276,301	23 14	15,306	.....
Oleomargarine and shortening manufacturers <sup>6</sup>			35,790,862	23 47		
Soap manufacturing companies			411,052	.27	43,020,000	3 58
Federal, State, and local Governments	7,646,076	1 28	379,438	.25	22,960,180	1 91
Exported	71,546,433	11 98	5,172,650	3 39	53,735,777	4 47
All other consumers and distributors	15,454,294	.92	2,037,334	1 33	1,285,557,296	23 76
Total sales	597,083,035	100 00	152,473,226	100 00	1,202,046,532	100 00

<sup>1</sup> Includes the following companies and their domestic subsidiaries (3 companies reported inconsequential sales through foreign branches) Swift & Co., Armour & Co., Wilson & Co., Inc., The Cudahy Packing Co., John Morrell & Co., Kingan & Co., Inc., George A. Hormel & Co., and Jacob Dold Packing Co.

<sup>2</sup> Fiscal years ended from Oct. 26 to Nov. 2, 1935.

<sup>3</sup> Excluding lard compounds.

<sup>4</sup> Includes oleo stock, oleo oils, oleo stearine, and oleomargarine.

<sup>5</sup> Includes cured, smoked, and canned beef and veal products; edible beef and veal offal; and inedible beef, veal, and pork offal.

<sup>6</sup> Includes 151,569,312 pounds of beef oleo and tallow and 903,914 pounds of veal oleo and tallow.

<sup>7</sup> Includes 909,393,109 pounds of beef products, 68,279,645 pounds of veal products, and 224,373,778 pounds of pork products.

<sup>8</sup> Includes salad dressing manufacturers.

<sup>9</sup> Includes sales to railroad, steamship, and other commissaries, and miscellaneous consumers and distributors.

<sup>10</sup> Includes sales to railroad, steamship, and other commissaries, soup manufacturers, animal food companies, feed and fertilizer companies, and miscellaneous consumers and distributors.

United States Federal Trade Commission (35, p. 1021).

tively small proportions of meat were distributed through each of several other outlets.

The channels of distribution of lard, edible oleo, and tallow, and miscellaneous beef, veal, and pork products, and the importance of each channel used by the same eight meat-packing concerns in 1935, are shown in table 35. For lard, independent retail meat markets and grocery stores took 55 percent of the total volume sold, and combination grocery and meat chains nearly 7 percent. Exports of lard were more important than for meat, and accounted for 12 percent of the total. Baking and biscuit companies took 6 percent. The other 20 percent was distributed among several different outlets.

Of the edible oleo and tallow sold, more than 25 percent was disposed of through brokers and commission houses. Baking and biscuit companies, and oleomargarine and shortening manufacturers each bought about 23 percent of the total. Independent retail meat markets and grocery stores took 13 percent. Exports were small.

The most important outlet for miscellaneous beef, veal, and pork products was to independent retail meat markets, accounting for 45 percent of the total volume sold. Combination grocery-meat chains bought 7 percent of the total. A miscellaneous group of consumers and distributors, such as railroad, steamship, and other commissaries, and other consumers and distributors took nearly 24 percent.

Of the products sold to various types of retail stores, to hotels, restaurants, hospitals, institutions, and to Federal, State, and local Governments, part was distributed through branch houses of the packers, and part directly from the packing plants. Data are not available on the relative importance of the two methods of distribution.

The distribution of meat and meat products by the eight large packing concerns agree rather closely with the distribution of manufacturers sales as reported by the Census of Business (table 36). As the Federal Trade Commission report does not show separately the volume distributed by packers through their branch houses, branch-house distribution and dis-

TABLE 36.—Comparison of relative importance of various outlets used for distributing meats and meat products produced in wholesale meat-manufacturing establishments, as reported by the Census of Business for 1939, and by eight important meat-packing concerns, as reported by the Federal Trade Commission for 1935

Outlet	Based on data from Census of Business, 1939 <sup>1</sup>		Based on data from Federal Trade Commission for 1935 <sup>2</sup>	
	Percent		Percent	
To retail stores .....	70		73	
To wholesalers and jobbers .....	18		15	
To institutions and other large users.....	9		9	
Exported .....	2		3	
To household consumers .....	1			
Total.....	100		100	

<sup>1</sup> Includes meat and meat products distributed from wholesale meat-packing establishments and from sausage and prepared-meats manufacturing plants. Distribution through the packer-owned branch houses is not shown separately, but is included with the distribution from the plants.

<sup>2</sup> Includes sales of fresh meat, cured and processed meat products, lard, edible oleo and tallow, and miscellaneous beef, veal, and pork products.

Based on data from United States Bureau of the Census (30, p. 12), and Federal Trade Commission (35, pp. 1017-1022).

tribution from the plant as reported by the census were combined for purposes of comparison. The census report shows that 70 percent of the meat was distributed from packing and processing establishments to retail stores compared with 73 percent for the eight packing concerns included in the study by the Federal Trade Commission. Sales to wholesalers and jobbers were 18 percent in the census report, and 15 percent in the report of the Commission. Other differences were small.

The two sets of data are not fully comparable in several respects. The census report covers 1,471 meat-packing establishments and 1,064 nonslaughtering establishments, and apply to 1939. The Federal Trade Commission study is based on only eight packing concerns. All are large, but combined they operate less than 100 plants. The study covers 1935.

### MARGIN FOR WHOLESALING

As the concerns that do slaughtering and processing also perform most of the wholesaling, the separation of the cost of performing these functions is probably somewhat arbitrary. The separation was made possible by the fact that meat-packing concerns have been required for certain purposes to report the cost of wholesale distribution separate from the cost of performing the functions of slaughtering and processing. Such processing operations as making sausage, hamburger, and other prepared meats, curing and smoking meats, and rendering lard may be carried on both in branch houses and in independent wholesaling establishments. Their expenses are therefore higher than if only the wholesaling function were performed.

### AVERAGE MARGIN FOR 1939

The average margin for distributing meat wholesale in 1939 including outward transportation was estimated at 7.7 percent of the wholesale value of the product. This estimate takes into consideration the sale of all of the meat by packing plants, and the sale of that part which is handled a second time by independent wholesalers and jobbers. The cost of wholesaling all meat by packers was 6.3 percent of the value of the product (table 5) (1). Of the total, 18 percent was also handled by wholesalers and jobbers. If their costs, including profits, were 7.6 percent of the wholesale selling price, which is about 20 percent higher than for meat-packing concerns, it would amount to an average of 1.4 percent on all meat sold wholesale that year. This added to the 6.3 percent, which was the margin for packers, brings the total margin to 7.7 percent of the wholesale price for all meat.

The expenses for distributing meat and other products by packers in 1939 are also shown in a study by the Federal Trade Commission (36). This study was based on reports from 30 meat-packing companies, which was an important segment of the industry as it included the larger concerns. The average margin for distributing products by these concerns (including outward transportation) was 6.8 cents per dollar of sales (table 37). This is slightly higher than the 6.3 percent shown by the Institute of Meat Packing. Outward transportation was equal to 18.3 percent of the total expense of wholesale distribution.

TABLE 37.—Cents per dollar of net sales absorbed by cost of merchandise sold, gross margin, and distribution expenses (including outward transportation) of 30 meat packers, grouped by channels of distribution, 1939

	Selling principally through own sales organization				Selling principally through brokers and manufacturers' agents to all classes of customers	Total all groups
	To retailers	To wholesalers and retailers	To all classes of customers	Through company owned branches to all classes of customers		
Number of companies.....	6	5	13	4	2	30
Net sales .....	\$4,241,458	\$43,445,860	\$44,744,779	\$1,772,680,405	\$6,262,616	\$1,871,375,118
Cost of merchandise sold.....	3,679,617	33,467,533	39,527,046	1,622,480,739	5,565,242	1,709,720,177
Gross margin on sales.....	561,841	4,978,327	5,217,733	150,199,666	697,374	161,654,941
Total distribution expense.....	442,153	3,610,760	4,433,620	116,643,015	414,772	125,744,320

CENTS PER DOLLAR OF NET SALES

Net sales .....	100.00	100.00	100.00	100.00	100.00	100.00
Cost of merchandise sold .....	86.75	87.54	88.34	91.53	88.86	91.36
Gross margin .....	13.25	11.46	11.66	8.47	11.14	8.64
Distribution expense:						
Salesmen's salaries .....	1.62	.85	1.35	.59	.31	.62
Other distribution personnel salaries and wages .....	3.91	1.54	3.12	2.54	1.79	2.53
Salesmen's commissions and bonuses, Social security and pension fund payments .....	.05	.24	.24	.....	.08	.01
Commission to brokers, factors, etc... Advertising and sales promotion expense .....	.26	.14	.33	.17	.09	.17
Outward transportation .....	.04	.45	.53	.06	.81	.08
All other distribution expense.....	.39	.73	.53	.45	.14	.46
Total distribution expense.....	1.56	3.22	1.34	1.17	2.73	1.23
Provision for bad debts.....	2.59	1.60	2.46	1.60	.67	1.62
Total distribution expense and provision for bad debts.....	10.42	8.77	9.90	6.58	6.62	6.72
Provision for bad debts.....	.34	.06	.18	.06	.07	.06
Total distribution expense and provision for bad debts.....	10.76	8.83	10.08	6.64	6.69	6.78

The average expense for distributing meat and meat products wholesale in the United States in 1939, as shown by the Census of Business, was 7.7 percent of the wholesale value of the product (table 38) (36). About 62 percent of all products distributed by the meat-packing companies was sold through manufacturers' sales branches with stock according to this report. The cost of distributing through branch houses was 6.8 percent of net sales. Service and limited-function slaughterers reported cost of 11.1 percent of net sales which probably included sales from peddler trucks. The lowest cost of distribution was by agents and brokers, amounting to 1.2 percent of net sales.

TABLE 38.—Expenses of wholesaling meats and meat products, by types of agencies, 1929, 1933, 1935, and 1939

Types of agencies	Establishments	Net Sales	Expenses			Expenses as percentage of net sales		
			Total <sup>1</sup>	Salaries and wages <sup>1</sup>	Other	Total <sup>1</sup>	Salaries and wages <sup>1</sup>	Other
	Number	1,000 Dollars	1,000 Dollars	1,000 Dollars	1,000 Dollars	Per-cent	Per-cent	Per-cent
<b>1929:</b>								
Wholesale merchants, including lobbors.....	2,157	663,723	63,523	(?)	(?)	9.6	(?)	(?)
Manufacturers' sales branches.....	1,155	1,890,443	128,342	(?)	(?)	6.8	(?)	(?)
Agents and brokers.....	130	145,270	2,901	(?)	(?)	2.0	(?)	(?)
Miscellaneous wholesaling agencies.....	163	402,850	73,526	(?)	(?)	1.8	(?)	(?)
Total.....	3,605	3,102,286	268,292	143,568	124,724	8.6	4.6	4.0
<b>1933:</b>								
Wholesale merchants.....	2,186	359,824	51,473	25,955	25,518	14.3	7.2	7.1
Limited-function wholesalers.....	94	5,073	1,492	553	939	29.4	10.9	18.5
Manufacturers' sales branches with stock.....	845	618,271	52,454	27,636	24,818	8.5	4.5	4.0
Manufacturers' sales branches without stock.....	20	61,006	4,308	1,750	2,558	7.1	2.9	4.2
Agents, brokers and miscellaneous agencies.....	52	31,074	508	208	300	1.6	.7	.9
Total.....	3,197	1,075,248	110,235	56,102	54,133	10.2	5.2	5.0
<b>1935:</b>								
Wholesale merchants.....	2,059	430,308	45,403	24,186	21,217	10.5	5.6	4.9
Wagon distributors.....	153	8,514	803	418	385	9.4	4.9	4.5
Manufacturers' sales branches with stock.....	937	1,080,929	64,497	33,540	30,957	6.0	3.1	2.9
Agents, brokers, and commission merchants.....	49	88,563	708	378	330	.8	.4	.4
Total.....	3,198	1,608,314	111,411	58,522	52,889	6.9	3.6	3.3
<b>1939:</b>								
Service and limited-function wholesalers.....	2,552	519,593	57,590	29,196	28,394	11.1	5.6	5.5
Manufacturers' sales branches with stock.....	924	1,076,480	73,024	39,510	33,514	6.8	3.7	3.1
Manufacturers' sales offices without stock.....	16	14,331	849	381	468	5.9	2.7	3.2
Agents and brokers.....	84	115,615	1,379	572	807	1.2	.5	.7
Total.....	3,576	1,726,019	132,842	69,659	63,183	7.7	4.0	3.7

<sup>1</sup> Does not include compensation to proprietors of unincorporated businesses.

<sup>2</sup> Data not available.

Abstracted from United States Census of Wholesale Distribution: 1929 (27); United States Census of American Business: 1933; Wholesale Distribution, Vol. 1, Summary for the United States, 1935, 78 pp. (Processed); United States Census of Business: 1935; Wholesale Distribution, Vol. 1, United States Summary, 1937, 136 pp. (Processed); and United States Census of Wholesale Trade, 1939, (29).

The average costs of wholesaling meat and meat products were different in the different census years. In 1935, the average wholesaling margin was 6.9 percent of net sales, whereas in 1933 it was 10.2 percent, and in 1929, 8.6 percent. The relatively high distribution cost in 1933 probably was accounted for by the low price at which meat and meat products sold that year. Many of the cost factors in wholesale distribution are in relation to volume and therefore are not greatly affected by the changes in the value of the product. When expressed as a percentage of net sales, the cost of distribution is relatively high during periods when prices are low, and relatively low when prices are high.

Wholesaling expenses, when applied to the same method of distribution, as shown by the Federal Trade Commission study and by the Census of Business, agree closely. In the Commission study, the expense for wholesaling meat by the four large packing concerns that sold principally through their own branch houses was 6.6 percent of net sales. This compares with 6.8 percent of net sales made through the packers' branch houses and through their own sales offices without stock, as reported by the Census of Business. Attention should be called to the fact that although the expenses apply in general to the same method of distribution, the number of plants involved, and the classifications used in the two studies are not identical. In the Commission study are included all sales of the four large concerns, which represent 95 percent of the value of the products sold by the 30 concerns for which data were included in the study. In the census report are shown the expenses for sales made through branch houses only as reported by all packers that used this method of distribution.

Expenses for wholesaling, according to the Commission study, also varied considerably among concerns that used different methods of distribution. Packers who sold principally to retailers had expenses of 10.8 percent of net sales, those who sold principally to wholesalers and retailers 8.8 percent, and those who sold principally through their brokers and manufacturers' agents 6.7 percent of net sales, compared with 6.6 percent for the companies that sold principally through their own branch houses.

#### MARGIN IN RELATION TO VOLUME OF BUSINESS

The margin for distributing meat and meat products by wholesaling concerns that render about the same service tends to vary with the volume of business handled. This may be noted from data reported by the Census of Business showing the expenses as percentage of net sales for 2,340 service and limited-functions wholesalers of meat that handled products valued at from less than \$10,000 to \$2,000,000 and over in 1939 (table 39) (29). The average cost of wholesaling meat and meat products by the concerns selling \$2,000,000 or more that year was 9.6 percent of net sales. The percentage margin increased as the volume handled decreased. Concerns with average sales under \$10,000 had expenses amounting to 21.6 percent of net sales. Small concerns generally manufacture relatively more sausage than large concerns which may account to some extent for their high operating costs. Comparable data are not available to show the cost of distributing products for other types of wholesalers. Although this type of wholesaler had considerably higher costs than the

average of all wholesalers it is probable that the general relationship between the cost of distribution and the volume of products handled also applies to other types of wholesalers.

TABLE 39.—Operating expenses of 2,340 wholesale merchants in meats and provisions, by size of business, 1939

Business-size group	Estab- lishments	Net sales	Total operating expenses	Total pay rolls	Other	Expenses as percentage of net sales		
						Total	Salaries and wages <sup>1</sup>	Other
						Number	1,000 dollars	1,000 dollars
\$2,000,000 and over.....	19	57,605	5,528	2,747	2,781	9.6	4.8	4.8
\$1,000,000—\$1,999,999.....	56	75,413	6,807	3,576	3,231	9.0	4.7	4.3
\$500,000—\$999,999.....	162	111,363	11,180	5,996	5,184	10.0	5.4	4.6
\$300,000—\$499,999.....	237	91,799	10,858	5,719	5,139	11.8	6.2	5.6
\$200,000—\$299,999.....	229	58,860	6,969	3,586	3,383	11.8	6.1	5.7
\$100,000—\$199,999.....	437	62,656	8,015	3,907	4,108	12.8	6.2	6.6
\$50,000—\$99,999.....	490	35,752	4,593	2,142	2,451	12.8	6.0	6.8
\$10,000—\$49,999.....	591	16,122	2,407	1,009	1,398	14.9	6.2	8.7
Under \$10,000.....	119	686	148	47	101	21.6	6.9	14.7
All groups combined.....	2,340	510,276	56,505	28,729	27,776	11.1	5.6	5.5

<sup>1</sup> Salaries and wages include payments to executives of corporations but not compensation to proprietors of unincorporated businesses.  
United States Bureau of the Census (29, p. 95).

### ITEMS OF COST COMPRISING MARGIN

About one-half of the costs for wholesale distribution of meat was made up of pay rolls (salaries and wages), according to both the Census of Business (table 39) and the study by the Federal Trade Commission (table 40). In the census study, all expenses other than salaries and wages were combined, but in the study by the Commission several additional items were segregated. Expenses for outward transportation was 1.2 percent of net sales, which was equal to 18 percent of the total distribution expenses. Expense for advertising and sales promotion, and provision for bad debts were relatively small. The difference between the gross margin of 8.6 percent and the total expenses for distribution of 6.8 percent represented profit, namely 1.8 percent.

A more detailed break-down of operating expenses for wholesale distribution of meat is reported by the Census of Business for a part of the wholesaling concerns (table 40). This includes operating expenses for 741 service and limited-function wholesale establishments with net sales ranging from \$100,000 to more than \$1,000,000. The average cost of wholesaling by this group was 11.4 percent of net sales, being therefore considerably higher than the average for all wholesaling. Administrative expense was 2.7 percent of net sales, selling 2.6 percent, delivery 1.8 percent. Warehousing, occupancy, and other expenses comprised a total of 4.3 percent of net sales. This table also shows that most of the items of expense decrease as the volume of business increases.

### COST OF WHOLESALING AFFECTED BY SEVERAL FACTORS

The cost of distributing meat and meat products wholesale by packers varies considerably, being affected by several factors. The schedules

TABLE 40.—*Distribution of operating expenses of 741 wholesale merchants in meats and provisions, by size of business, in excess of \$100,000, 1939*

Business-size groups	Establishments	Net sales	Operating expenses as percentage of net sales <sup>1</sup>						
			Total	Administrative	Selling	Delivery	Warehouse	Occupancy	Other
			Percent	Percent	Percent	Percent	Percent	Percent	Percent
	<i>Number</i>	<i>1,000 dollars</i>							
\$1,000,000 and over...	49	89,833	10.5	2.2	2.2	1.9	1.3	1.6	1.3
\$500,000-\$999,999...	119	83,526	10.8	2.9	2.4	1.7	1.3	1.7	.8
\$300,000-\$499,999...	173	67,458	11.6	2.9	2.5	1.9	1.4	2.1	.8
\$200,000-\$299,999...	147	36,285	12.5	3.0	3.2	2.0	1.2	2.3	.8
\$100,000-\$199,999...	253	36,903	13.4	3.2	3.0	1.9	1.0	2.6	1.7
All groups combined...	741	314,005	11.4	2.7	2.6	1.8	1.3	1.9	1.1

<sup>1</sup> Operating expenses include no compensation for active proprietors of unincorporated businesses. (United States Bureau of the Census (29, p. 106).

below indicate the ranges within which the cost of wholesaling by meat packers ordinarily may be expected to vary according to the channels of trade, and the kind of product handled.<sup>23</sup> These schedules are rough composites of trade opinion and research studies made by meat-packing concerns. The main reasons for these variations apparently are that both the channels of trade and the kinds of product sold are closely associated with the size of the unit sale, and the amount of service furnished by wholesalers. As the factors mentioned above are interrelated to a considerable extent, they will be discussed together instead of in separate sections. The cost per hundredweight of distribution according to the different channels of wholesale trade and the kinds of products handled, are as follows:

	<i>Dollars</i>
Channels of trade:	
Car and truck loads sold through brokers .....	Up to \$ .12½
Large lots sold for local delivery .....	\$0.25 to .050
Wi-call sales from packing-house coolers .....	.50 to .75
Ordinary car-route operation .....	.75 to 1.00
Ordinary local branch-house operation .....	1.00 to 1.25
Small-order peddler trucks .....	2.00 to 2.25
Kind of product:	
Carcass beef, veal, and lamb .....	.50 to .75
Fresh pork cuts, variety meats, etc. ....	1.00 to 1.25
Dry-salt meats .....	.50 to 1.00
Smoked meats .....	1.25 to 1.50
Cooked meats .....	1.50 to 2.00
Sausage and other manufactured specialties ..	2.00 to 2.50
Lard and shortening .....	.50 to .75
Poultry, butter, cheese, etc. ....	1.00 to 1.50

The above expense ranges include local delivery (except as otherwise indicated) but do not include long-distance over-the-road transportation. This, of course, is a part of the wholesale distribution cost, but it varies considerably by geographic areas. Products moved from the Middle West to the Pacific Coast may entail a transportation cost as high as \$3 per hundredweight. From the Middle West to the Eastern Seaboard the average transportation cost is from \$1 to \$1.50 per hundredweight for fresh meat and somewhat less for cured meat and lard. The average cost

<sup>23</sup> Estimated and verified by members in the packing industry.



of all long-distance meat transportation is not known, but may be in the neighborhood of 75 cents per hundredweight.

In normal times, considerable quantities of meat products are sold in carload or truckload lots by a packer to a distributor, which entails a transportation charge and a small brokerage commission. Many such sales pass through the hands of secondary wholesalers and thus involve further wholesaling expense but substantial quantities move direct to the larger retailers.

Locally distributed sales may involve low wholesaling expense when large purchases are made direct from a meat-packing plant. Delivery charges for truckload lots to a single destination involved an expense of no more than 10 cents to 15 cents per hundredweight in the prewar period. The selling and office services connected with the sale may cost 10 cents to 15 cents additional, giving a total wholesaling expense of less than one-half cent per pound.

As the size of the order diminishes, the selling cost per hundredweight is likely to increase. The delivery cost per stop is nearly the same regardless of the quantity delivered, the selling expense for small orders is practically the same as for large orders, and the clerical work is about the same. Thus, the selling expense per hundredweight is higher for a small order than for a larger order.

Distribution by car routes and through branch houses generally involves orders of varying sizes. A car route serving a scattered area, with deliveries once or possibly twice per week, would normally expect to handle orders averaging between 200 pounds and 400 pounds in size, and probably would entail a selling cost (exclusive of over-the-road transportation) of from 75 cents to \$1 per hundredweight. Local branch houses serving a more limited area may be called on for more frequent deliveries and therefore may handle somewhat smaller orders, averaging perhaps 75 to 150 pounds, with a distribution cost of from \$1 to \$1.25 per hundredweight. The comparatively lower cost of distributing meat products by car routes rather than through branch houses apparently may be accounted for largely by the difference in the size of the unit sale, and the service furnished by the wholesalers. In the case of car routes, the dealer must place orders further ahead and in somewhat larger quantities, he does not have the opportunity to fill gaps in his stock on short notice, and some of the products may come to him in slightly less fresh condition than if distributed from a local branch house in which some products may have been partly processed.

A type of distribution involving relatively high cost per hundredweight is the peddler truck which is operated by a driver-salesman who sells specialty products to small dealers, delicatessen stores, restaurants, etc. from a stock carried on the truck. The average order may be not more than 25 pounds, and the average selling cost may run as high as \$2 to \$2.50 per hundredweight.

Various kinds of packing-house products involve varying distribution costs, depending on their nature and on the size of the unit of sale in which they commonly move. Carcasses of dressed beef, veal and lamb, dry salt meats, and lard, commonly are sold in rather substantial units, involving a minimum of handling and selling effort. At the other extreme,

items like sausage and cooked meats commonly are sold in relatively small units, and require extensive sales promotion and other distribution expenses. Fresh pork cuts, smoked meats, poultry, and dairy products occupy a middle ground. Since all these products commonly are sold and delivered together in combination orders of varying characteristics, an exact calculation of the cost for individual products is necessarily somewhat arbitrary, but the above estimates are reasonably well established by the experience of the trade.

From the foregoing discussion it is noted that wholesale distribution costs are low for the bulk items, and for sales where not much service is rendered. On the other hand, costs are high for products where the unit of sale is small and where a relatively large amount of service is furnished. The variation in the efficiency of operation may be reflected to a considerable extent in the range of costs for the same type of distribution and for the same product.

### MARGIN AND COSTS FOR RETAILING MEAT

Retail meat dealers operate in all parts of the country and play an important part in the distribution of meat. They constitute the final link through which the products pass from the producer of livestock to the consumer of meat. Meat dealers perform many varied services, the payment for which constitutes about one-half of the aggregate margin absorbed in the distribution and processing of livestock and meat.

### METHODS OF OPERATION AND SERVICES PERFORMED

The distribution of meat to consumers is principally through retail meat markets and combination stores (grocery and meat), although some is sold through general stores. Only small quantities are sold directly to consumers by producers who do slaughtering. The retail meat dealer generally buys carcasses, or parts of carcasses, from animals slaughtered in commercial packing plants. The meat is obtained from wholesale departments at packing plants, from branch houses, car routes, truck routes, or from brokers. The purchasing by retailers of carcasses from farm-slaughtered animals, and the buying and slaughtering of animals had been largely discontinued by the beginning of World War II, except in certain sections. During the war, however, there was a definite increase in this type of slaughter.

The retail meat dealer cuts the wholesale products either according to an adopted standard or according to the special requirements of his trade. He may bone some cuts, grind meat, and make hamburger and sausage.

The margin for retailing meat covers not only compensation for a variety of services performed by the retail meat dealer, but it must also allow for losses in weight of the product due to waste from cutting, trimming, and boning, and from shrinkage through loss of moisture while held under refrigeration at the store. The services performed by a meat dealer include the maintenance of a retail market with storage and display refrigeration facilities, waiting on the trade, cutting, trimming and preparing cuts, and grinding meats. Some stores provide credit and delivery service; others are of the cash-and-carry type.

The loss in weight of carcasses or wholesale cuts resulting from their break-down into cuts to meet the requirements of the retail trade is generally considerably greater for beef than for other kinds of meat, primarily because more boned cuts are produced. The degree of waste and shrinkage varies also with the method of cutting. A beef carcass of Good grade, cut according to the "Chicago style," which is virtually the method of cutting adopted by the Office of Price Administration for price-control purposes, produces about 82.7 percent of meat and 17.3 percent of waste and shrinkage (including suet, cod, and shop fat) (table 41) (8)<sup>24</sup>. The same grade of beef carcass if cut according to the "New York style" yields about 80 percent of meat and has about 20 percent waste and shrinkage. Waste and shrinkage is greater for beef carcasses of low grade than for those of high grade, unless excess fat is added.

TABLE 41. — *Yield of beef carcasses of different grades, cut by different methods*

Parts	Chicago style of cutting			New York style of cutting		
	Choice grade	Good grade	Medium grade	Choice grade	Good grade	Medium grade
	Percent	Percent	Percent	Percent	Percent	Percent
Trimmed retail cuts.....	68.1	70.5	72.6	65.0	67.2	68.9
Lean trimmings.....	4.2	3.8	3.8	4.3	3.9	3.8
Stew meat and kidneys.....	8.4	8.4	9.2	9.0	9.2	10.5
Suet, cod, and shop fat.....	10.2	7.0	3.4	10.6	6.8	3.4
Waste and shrinkage.....	9.1	10.3	11.0	11.1	12.9	13.4
Total.....	100.0	100.0	100.0	100.0	100.0	100.0

Edinger, see footnote 24, p. 72.

The waste and shrinkage of a veal carcass is about 11 percent, of a lamb carcass about 8 percent, and of a pork carcass about 1.5 percent. Pork cuts are generally not boned, which accounts for the relatively smaller proportion of waste than for beef, veal, or lamb. Meat held in the refrigerator dries out, and this shrinkage in weight must also be taken into account when establishing retail prices of meat. Based on these percentages, the average retail waste, cutting loss, and shrinkage of all meat sold in 1939 is estimated at about 8 percent.

The extent to which meat loses moisture in the retail market depends on the length of time it is held, the condition of refrigeration, and the kind of meat involved. Meat with high moisture content shrinks under the same conditions at a greater rate than meat with lower moisture content. The cutting shrinkage, even when no trimming or boning is done, probably is about 1 percent of the weight.

Trimming losses are of two kinds, the removal of inedible parts that have virtually no value, and trimming that are edible but are of lower value than the value of the retail cut. Heavy beef has a larger percentage of waste fat than the beef of lower grade. What trimming losses will be depends on the extent to which a cut is trimmed, and on the use made of the trimmings. Boning materially reduces the weight of most cuts, and

<sup>24</sup> Edinger, Arthur T., *Meat Cutting and Pricing Methods*, U. S. Agr. Mktg. Admin., 40 pp. illus., 1942. (Processed.)

the price of the boned meat per pound needs to be increased as a result. (See table 23 for the percentage of bone in different cuts.)

As the percentage of bone in meat varies greatly with the grade, which is largely determined by the degree of finish, the reduction in weight of meat due to boning depends to that extent on the quality of the meat. The salvage value of the bones removed in a retail market is low.

#### NUMBER AND KINDS OF STORES IN OPERATION

In 1939, a total of 229,394 retail establishments handling meat were reported by the Census of Business (table 42) (28). Of these, 42,360 were meat markets (including fish), and 187,034 were combination stores (groceries and meats). Ninety-six percent of the meat markets were independently owned, and 4 percent were owned by chains. Of the combination stores (grocery and meat), 89 percent were under independent ownership and 11 percent under chain ownership. On the basis of the value of sales, chain ownership is relatively more important for combination stores than for meat markets. The stores under chain ownership handled 38 percent of the total value of products sold in combination stores that year. Chain meat markets handled only 10 percent of the value of products sold through meat markets.

TABLE 42.—Number of stores and value of sales of meat markets (including fish) and combination stores (grocery and meat), by type, in the United States, 1939

Type of market	Stores		Sales			
	Meat markets	Combination meat-grocery stores	Value		Percentage	
			Meat markets	Combination meat-grocery stores	Meat markets	Combination meat-grocery stores
	Number	Number	1,000 dollars	1,000 dollars	Percent	Percent
Independents.....	40,755	166,777	673,536	3,384,226	89.7	64.6
Chains.....	1,605	20,257	77,261	2,112,092	10.3	38.4
Total.....	42,360	187,034	750,797	5,496,318	100.0	100.0

United States Bureau of the Census (28, pp. 671, 674).

Both meat markets and combination markets (groceries and meat) of the chain type do a larger average volume of business than markets of these types under independent ownership. In 1939, 73 percent of the chain meat markets had annual sales of \$20,000 and over, but only 23 percent of the independent markets had annual sales as high as that (table 43). Annual sales of \$20,000 and over for combination stores included 92 percent of the chain markets and 30 percent of the independent markets.

Independent retail markets, both those that handle meat only and those that handle meat and groceries, have met keen competition from chain stores. The chain-store system, where a number of scattered stores are under single ownership and operate under centralized management,

TABLE 43.—Size of independent and chain meat markets in the United States, 1939

INDEPENDENT MARKETS		
Annual Sales	Meat — fish markets	Combination stores (grocery and meat)
	Number	Number
Less than \$10,000 .....	19,170	65,879
\$10,000 to \$19,999 .....	12,335	51,290
\$20,000 to \$29,999 .....	3,814	18,673
\$30,000 to \$49,999 .....	3,243	18,159
\$50,000 and over .....	2,193	12,776
Total .....	40,755	166,777

CHAIN MARKETS		
Less than \$10,000 .....	156	466
\$ 10,000 to \$ 19,999 .....	284	782
\$ 20,000 to \$ 29,999 .....	267	1,299
\$ 30,000 to \$ 49,999 .....	357	3,777
\$ 50,000 to \$ 99,999 .....	395	7,524
\$100,000 to \$299,999 .....	137	5,269
\$300,000 and over .....	9	1,140
Total .....	1,605	20,257

United States Bureau of the Census (28, pp. 671-672, 675, 874-875).

apparently has some advantages, particularly in buying, over independently operated stores. Large quantities can be bought and the products distributed economically among the member stores. Chains have the disadvantage, on the other hand, in that many patrons feel that independent operators take greater personal interest in their customers. Some also fear that chain stores may create a monopoly advantage in the retail trade.

The establishment of supermarkets of the combination-store type, was an important development before World War II. They were mostly under chain ownership. They often took substantial business away from the smaller community stores.

Services rendered by retailers who handle meat vary greatly. Many stores are now of the cash-and-carry type, whereas others furnish both credit and delivery service. The cash-and-carry features apparently are relatively more common among chain stores than among the stores under independent ownership. The nature of other services rendered by the meat dealer, such as trimming retail cuts and boning meat varies considerably among markets, and this naturally affects their operating margins.

#### SELF-SERVICE RETAIL MEAT MARKETS

Some self-service markets for selling meat at retail are now being operated. This method of retailing meat has been adopted at some supermarkets, the development apparently having been most pronounced on the Pacific Coast. The cutting, wrapping, and packaging of meat is done in the cutting room of the store. At stores where a large volume of meat is handled, meat cutters can devote their full time to cutting and preparing retail cuts. When using professional meat cutters in this way, the cost of labor is reduced if clerks without meat-cutting training keep the self-service cases replenished.

Retail distribution of frozen meat is of recent development. If the retail distribution of fresh frozen meat is successful, it will probably give stimulus to the pre-cutting of meat into retail cuts at the packing plants, although some may be prepared at central cutting rooms operated by chain stores and by supermarkets. If frozen meat is to be handled in self-service stores, it will require refrigerator display and holding cabinets that are suitable for dispensing meat and for keeping the foods frozen.

#### PRODUCTS HANDLED AT RETAIL MARKETS

Meat markets handle other products as well as meat, such as poultry, fish, other sea food, butter, cheese, milk, and eggs. According to the Census of Business, meat comprised 96 percent of the total sales at meat markets in 1939. At combination stores, the sale of meat represented about 28 percent of the total sales. The rest was made up mainly of groceries, fruits, vegetables, and dairy products. It is estimated that of all meat sold that year, 68 percent was handled in combination stores and in other grocery stores that sold cured meat. About 30 percent of the meat was sold through meat markets, and 2 percent was sold through other markets such as delicatessen stores and fruit stores.

#### MARGIN FOR RETAILING MEAT

The many different cuts obtained from a carcass sell in the retail market at prices that vary widely. In general, the different cuts are priced on the basis of their anticipated consumer demand. As different parts of the carcass sell at different prices, it is not possible to determine directly the retail margin for individual cuts but the margin can be determined for all cuts combined by deducting the purchase value of the carcass from the combined income from all salable parts of the same carcass or wholesale cut.

The retail margin of a carcass or wholesale cut of meat is the difference between the cost to the retailer and what he receives for it. It is the compensation for the use of facilities and equipment, for preparing the meat, and for merchandising the product. It also must allow for the shrinkage or waste that results from cutting and handling. The preparation of the meat involves the services and facilities for breaking up the carcass or wholesale cut into cuts suitable for the retail trade, trimming the cuts, boning, and grinding meat, keeping it refrigerated, wrapping, displaying, and maintaining the store and equipment. Other services are, waiting on the trade, and providing delivery and credit service.

#### AVERAGE MARGIN FOR 1939

The average margin for retailing meat in 1939 was estimated at 24 percent of net sales (table 44). This margin was based largely on reports of two studies of costs of retailing meat in 1939 weighted by the number of stores involved (17, 18). This agrees closely with a retail margin of 24.5 percent of the sales value of meat derived by estimating the retail margin for 1939 on the basis of two extensive surveys made by the Bureau of Labor Statistics for the Office of Price Administration in

August and October 1942.<sup>15</sup> The retail margins in 1942, as shown by these surveys, was carried back to 1939 by adjusting for the trends in the wholesale and the retail price quotations that had prevailed during that period.

TABLE 44.—Gross margins, operating costs and profits for retailing meat, 1939

Items	Average all stores	Study by Mitchell (138 stores) <sup>1</sup>	Study by Lindquist (36 stores) <sup>2</sup>
	Percent	Percent	Percent
Net sales .....	100.0	100.0	100.0
Cost of goods sold .....	76.0	76.5	74.0
Gross margin .....	24.0	23.5	26.0
Total expenses .....	22.0	21.7	23.0
Salaries and wages .....	13.9	14.0	13.8
Rent or occupancy .....	3.0	3.0	3.3
Advertising .....	.6	.4	.8
All other expenses .....	4.5	4.3	5.1
Net profit .....	2.0	1.8	3.0
Stock turnover (times per year).....		50.8	37.9

<sup>1</sup> Mitchell (18, p. 27).

<sup>2</sup> Lindquist (17, p. 9).

Operating expenses in 1939, as shown in the table, comprised 22 percent of net sales, and profits 2 percent. Salaries and wages were the most important of the operating expenses, and amounted to 14 percent of the net sales. This was equal to 58 percent of the gross margin. These estimates were also based largely on the same two studies of cost of distributing meat at retail that year. Data on the cost of retailing meat are meager but some additional information was available to substantiate these findings.

Retail margins based on selling price of meat should not be confused with the percentage mark-up on cost by retail dealers. A mark-up of 25 percent of the cost price is equal to a margin of 20 percent on the selling price. A 30 percent mark-up on cost is equivalent to a 23.1 percent margin on sales, a 35 percent mark-up on cost to a 25.9 percent margin, and a 40 percent mark-up to a 28.6 percent margin. The average margin of 24 percent of the selling price, derived in this study, is equal to an average mark-up of 31.6 percent of the cost price of the meat.

The study by Mitchell (18), based on an analysis of 138 independent retail meat markets in the United States, showed an average gross margin of 23.5 percent of net sales in 1939. Of this, 21.7 percent was composed of expenses of operation, and 1.8 percent of profits. Profits were made by 71 percent of the concerns included, and losses were incurred by the other 29 percent. For the profitable stores, the gross margin was 24.2 percent of net sales, and for the unprofitable ones 20.0 percent (table 45). The stores in the profitable group had an average net profit of 3.3 percent of net sales, and the unprofitable ones had an average loss of 1.4 percent. The average stock turn-over for the year for all stores was 51 times, for the profitable stores 54 times, and for the unprofitable stores 47 times. A majority of the reporting concerns ob-

<sup>15</sup> The Bureau of Labor Statistics survey in August 1942 included 8,294 food stores in 33 primary cities in the United States and the October 1942 survey included 11,217 food stores in 56 primary and secondary cities. Most of the stores included in these surveys reported prices on meats.

tained more than 90 percent of their income from the sale of meat. Almost all carried some other line of merchandise, the most common being groceries, fish, vegetables, and dairy products. The average (median) net sale per store was \$29,800. Forty-three percent of the stores reporting were classified as cash concerns (over 90 percent of sales for cash), and 57 percent provided open credit (10 percent or more on charge account).

TABLE 45.—Operating and merchandising ratios of 138 retail meat markets in the United States, 1939

Profit and loss statement	All concerns	Profitable concerns	Unprofitable concerns
	Percent	Percent	Percent
Net sales .....	100.0	100.0	100.0
Cost of goods sold .....	76.5	75.8	80.0
Gross margin (percent of sales).....	23.5	24.2	20.0
Total expense .....	21.7	20.9	21.4
Salaries, owners and officers .....	7.8	7.1	8.3
Wages, all other employees .....	6.2	6.2	5.8
Occupancy expense (92 percent of concerns renting) .....	3.0	2.9	3.1
Advertising .....	.4	.3	.7
Bad debt losses .....	.3	.3	.2
All other expense .....	4.0	4.1	3.3
Profit or loss .....	1.8	3.3	( <sup>1</sup> ) 1.4
Realized mark-up (percent of cost).....	30.8	32.0	25.0
Inventory turn-over (times per year).....	50.8	53.9	46.5

<sup>1</sup> Loss.

Mitchell, (18, p. 27).

The study by Lindquist (17), covering 38 representative retail meat markets located in different parts of Chicago, showed a gross margin of 26 percent of net sales in 1939. The average operating expenses for these stores was 23 percent of net sales, and the average profit 3 percent. This study included cash-and-carry, and credit-and-delivery markets, the former type predominating. The stores varied from 1-man to 18-man markets with annual sales ranging from \$11,976 to \$275,417. The average sale per store was \$45,446, and the average stock turn-over was 38 times during the year.

Other studies by Mitchell (18) show that in 1939 the average margins were 19.2 percent of net sales for combination stores, and 18.4 percent for grocery stores, compared with 23.5 percent for meat markets. But the expenses or margins for operating the meat department and the grocery department of combination stores cannot be ascertained from these comparisons.

However, a study of 25 general stores for which the margins on sales are shown by departments reveals that in 1939 the average margin for the meat department was 29 percent and for the grocery department 16 percent (19). This comparison also checks closely with the margins for operating these two departments by three supermarkets in California, as shown by the same study. The margin for operating the meat department was 29 percent of sales compared with 15 percent of sales for the grocery departments. As sales of meat require more service than the sale of groceries, the expenses in relation to sales are higher.



## TRENDS IN MARGIN

The gross margins, expenses, and profits of a representative group of retail meat markets located in different parts of Chicago are available for the 11-year period, 1929-39 (16). From 34 to 50 markets were included in arriving at the averages each year. The average gross margin ranged from 22.4 percent of sales in 1929 to 29.2 percent in 1932 (table 46). Operating expenses, which made up most of the gross margin, when expressed as percentage of net sales, were relatively large when prices were low, and relatively small when prices were high. This comes about through the fact that when prices change some operating costs either remain the same or change less than the change in prices. Between 1929 and 1932, the total expenses per pound of product sold declined from 5.8 cents to 4.3 cents, but the price of the product dropped from 31 cents per pound to 16.3 cents per pound. The result was that the total expenses of 18.9 percent of sales in 1929 increased to 26.6 percent of net sales in 1932. When prices declined the retailer's operating expenses declined relatively less; therefore the cost of doing business (in percentage of sales) increased and this required a higher percentage spread. However, it does not necessarily follow that a wider margin is always realized when prices are declining, as retailers may be forced to operate on a smaller net margin or even at a loss for limited periods.

TABLE 46.—Gross margin, operating expenses and profits as percentage of net sales for retail meat markets in Chicago, by years, 1929-39

Items	Percentage of net sales										
	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Net sales.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Cost of goods sold.....	77.6	71.9	71.7	70.8	70.9	73.7	77.3	71.7	75.6	74.5	71.0
Gross margin.....	22.4	28.1	28.3	29.2	29.1	26.3	22.7	28.3	24.4	25.5	29.0
Total expenses.....	18.9	20.6	23.8	26.6	26.5	21.1	20.9	20.9	20.5	22.0	23.0
Wages.....	12.0	12.9	14.6	16.1	15.8	14.3	12.5	12.4	12.5	13.1	13.8
Rent.....	2.4	2.4	2.9	3.2	3.2	2.8	2.1	2.2	1.9	2.1	2.3
All other expenses.....	4.6	5.3	6.3	7.4	7.5	4.1	6.1	6.3	6.1	6.8	6.9
Net profit.....	3.5	4.5	4.5	2.6	2.6	2.1	1.8	4.4	3.9	3.5	3.0
Stock turnover (times per year).....	75.0	70.3	57.4	60.2	57.4	54.0	48.2	48.2	43.4	40.4	37.9
Average merchandise inventory.....	693	639	570	476	468	563	758	792	992	910	859
	Per pound of products sold										
	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents
Selling price.....	31.0	26.8	21.8	16.3	14.7	16.9	21.3	21.0	23.2	22.2	23.0
Cost price.....	21.2	20.2	15.7	11.5	10.1	12.5	16.1	15.8	17.6	16.7	16.4
Gross margin.....	6.8	6.6	6.1	4.8	4.3	4.4	4.9	5.2	5.6	5.5	5.6
Total expense.....	5.8	5.5	5.2	4.3	3.9	1.0	4.1	4.1	4.7	4.8	5.0
Net profit.....	1.0	1.1	.9	.5	.3	.4	.5	.9	.9	.7	.6

Lindquist, 16, p. 113.

The severe drought in 1934 resulted in heavy liquidation of livestock that year, but the volume of marketings dropped sharply by early 1935. The smaller volume of product caused prices to advance, and the margin per

pound of product increased somewhat but the reduced tonnage of meat handled largely accounted for the small profit that year. The more favorable supplies of livestock and the improvement in general business conditions in 1936 helped to stabilize the meat industry. Tonnage sales increased so that, even with slightly lower wholesale prices, retailers were able to increase their margin and their dollar volume, and to absorb the higher costs of wages, rent, supplies, etc., without increasing their percentage cost of doing business. Conditions from 1936 to 1939 continued about the same.

A marked change which took place during the 11-year period was the sharp reduction in the number of times the stocks were turned over per year. In 1929, the stores included in the study had an average stock turn-over of 75 times per year. This decreased rather regularly during the period, to 60 times in 1932, 48 times in 1935, and 38 times in 1939. The relatively small stock turn-over after 1935 was associated with the high average merchandise inventories maintained, compared with earlier years. Profits varied from a low of 1.8 percent of net sales in 1935 to a high of 4.5 percent in 1930 and 1931.

A comparison of gross margins, expenses, and profits for the retail distribution of meats in the 10-year period, 1925-34, may be made from an extensive study by Tobin and Greer (21). The price of meat remained relatively high from 1925 to 1929, but the depression brought a decline the following year which continued until 1933 (table 47). Prices advanced some in 1934. For the 4-year period, 1925-28, the average retail price of meat was 25 cents per pound compared with an average price of 16.3 cents per pound for the 4-year period 1931-34. The average wholesale price for these two periods was 19.4 cents per pound and 11.4 cents per pound, respectively. The average gross margin changed from 5.6 cents per pound in 1925-28 to 4.9 cents per pound in 1931-34. As the changes in the retail and wholesale prices between these two

Table 47. Comparison of margins in cents per pound and in percentage of retail value of different kinds of meat for the two 4-year periods, 1925-28 and 1931-34

Kind of meat and period	Value at retail, per pound	Value at wholesale, per pound	Margin for retailing	
			Per pound	Percentage of retail value
	Cents	Cents	Cents	Percent
Beef:				
1925-28 .....	25.7	17.9	7.8	30.4
1931-34 .....	18.7	12.2	6.5	34.8
Veal:				
1925-28 .....	23.0	20.7	2.3	37.3
1931-34 .....	21.9	12.1	8.9	42.4
Pork, and lard:				
1925-28 .....	28.8	26.2	2.6	15.1
1931-34 .....	15.2	10.7	3.5	24.6
Mutton and lamb:				
1925-28 .....	22.8	25.4	7.4	22.6
1931-34 .....	21.1	14.4	7.0	32.7
All meats:				
1925-28 .....	25.0	19.4	5.6	22.4
1931-34 .....	16.3	11.4	4.9	30.1

Tobin and Greer (21), p. 75-76.

periods were not proportional, different percentage margins resulted. The average gross margin was 22.4 percent of net sales in 1925-28, and 30.1 percent in 1931-34. Wage payments were equal to 12.0 percent of net sales during the first period and 16.6 percent during the second period.

Data on gross margin and operating costs of retail meat chains are also available for 1933 and 1934 by the Bureau of Business Research of Harvard University (table 48) (21). For 1934, similar data are also available for meat sides (departments) of combination chains. For retail meat chains, 5 companies with 83 stores were included in 1933 and 6 companies with 127 stores in 1934. For meat sides of combination chains, data were available for 21 companies with 4,943 stores. The average sales per meat market was \$40,558 in 1933 and \$49,656 in 1934 and per meat side of combination chains \$21,813. The gross margin for meat markets the first year was 30.2 percent of net sales, and the second

TABLE 48.—Operating results of retail meat chains, 1933 and 1934, and of meat sides of combination chains, 1934

[Median figures<sup>1</sup>; net sales = 100 percent]

Item	Retail meat chains		Meat sides of combination chains 1934
	1933	1934	
	Number	Number	Number
Chains .....	5	6	21
Stores .....	83	127	4,943
Aggregate net value .....	\$3,268,000	\$4,261,000	\$130,737,000
Average sales per store (median) .....	\$ 40,558	\$ 49,656	\$ 21,813
	Percent	Percent	Percent
Net cost of merchandise sold .....	69.80	73.56	73.15
Gross margin .....	30.20	26.44	26.85
Store expenses:			
Salaries and wages .....	15.30	15.07	12.96
Tenancy costs (including depreciation of major improvements) .....	3.09	3.71	3.29
Depreciation of fixtures and equipment .....	2.16	1.43	1.57
Light, heat, water, power, and refrigeration .....	2.11	1.72	1.73
Supplies .....	1.20	1.58	1.22
Advertising .....	1.93	1.09	(*)
Insurance (except on real estate) .....	.25	.29	1.32
Taxes (except on real estate and Federal tax on income) .....	.63	.40	(*)
Miscellaneous expenses .....	1.58	(*)	(*)
Total expense before interest .....	29.75	27.69	(*)
Total interest (including interest on net worth) .....	.75	.55	(*)
Total expenses including interest .....	30.50	28.25	(*)
Net loss .....	.07	.67	(*)
Net other income .....	.83	.63	(*)

<sup>1</sup> Median figures give equal weight to each chain irrespective of sales volume or number of stores. As all the medians were set independently, the figures for the several items cannot be expected to tie to the respective totals.

<sup>2</sup> Figures for this item were not reported by all the firms in the group.

<sup>3</sup> Included with miscellaneous expenses.

<sup>4</sup> Includes communication, traveling, and unclassified.

<sup>5</sup> Includes communication, advertising, taxes, and unclassified.

<sup>6</sup> It is impossible to give these data because the chains, in reporting, did not allocate administrative, general, warehouse, and all other expense to the stores or sides, respectively. It does not seem desirable to imply that such expenses should be distributed on the basis of sales.

Schmalz (21, tables 2-1, pp. 4-7).

year 26.4 percent of net sales. For meat sides of combination stores the gross margin was 26.8 percent. In both years the total expenses for meat markets exceeded the gross margin, so that losses instead of profits were incurred. The loss the first year was equal to 0.07 percent of net sales, and the second year 0.67 percent. Net profits were not determined separately for meat sides of combination chains.

The study by Lindquist of retail meat markets in Chicago and the Harvard University study of meat chains show virtually the same gross margin in 1933. However, the meat chains had higher total expenses than the meat markets, as they incurred a loss instead of a profit. For 1934, the Lindquist study showed a gross margin of 26.3 percent of net sales compared with 24.7 percent for the Harvard University study. The total expenses before interest was allowed was about the same in the two studies.

#### VARIATION IN MARGIN AMONG MEAT FROM DIFFERENT SPECIES

Retail margins are not the same for the different kinds of meat. The margins, based on the study by Tobin and Greer (24) are shown in table 47 for the two average 4-year periods, 1925-28, when meat prices were relatively high, and 1931-34 when meat prices were relatively low. During the higher-price period, the average retail margin based on the selling price, was 30 percent for beef, 37 percent for veal, 15 percent for pork and lard, and 23 percent for mutton and lamb. During the lower-price period, the average retail margin was 35 percent for beef, 42 percent for veal, 25 percent for pork and lard, and 33 percent for mutton and lamb.

The difference in the retail margin of various kinds of meat largely reflects the amount of processing and the amount of service furnished at the retail market. The retail margin for pork is relatively low as most of the processing—such as cutting, curing, and smoking—are done in the packing plant. In the case of beef, veal, and lamb relatively more processing is done at the retail market. The preparation of retail cuts, involving trimming and boning in addition to cutting, varies greatly among different meat dealers, and among cities and regions. The boning of meat greatly affects the retail margin. In addition to the labor involved, the removal of bones decreases the weight of the salable meat, which in turn increases the retail price per pound of meat. The effect on the retail margin from such services as delivering the meat to the home and providing credit service to customers probably will be generally applicable to meats of all kinds.

A study of the consumers' cost of meat, the retailing, wholesaling and processing margins, and the returns to farmers, for the fiscal year ended about November 2, 1935, was made by the Federal Trade Commission (35). This study of margins was based on retail and wholesale prices derived from reports of the Bureau of Agricultural Economics and the Bureau of Labor Statistics, and other market reports. The margin shown was the difference between the price received by one agency in the process and the next such agency. This method differed from the other studies referred to which were based on data on margins obtained from operating concerns.

As shown by the Federal Trade Commission study, the retailing margin for beef was 30.6 percent of the retail price, for veal 37.6 percent, and for pork 22.2 percent. If the meat moved through retail channels, the average margin for these meats combined, when weighted by the quantity of meat sold in the United States, would be about 27 percent of the sales price.

These margins are considerably higher than those shown for that year by Tobin and Greer, and by Lindquist. Possible reasons for this may have been that the prices used were for grades of meat somewhat better than average quality, or that the retail price series that were developed were heavily weighted by cuts of meat of relatively high value.

#### VARIATION IN MARGIN AMONG CUTS OF MEAT

The retail margin varies among different cuts of meat obtained from the same species of animal. This variation is shown by information collected by the Bureau of Labor Statistics in the study of retail food margins made for the Office of Price Administration in August 1942.<sup>20</sup> The margin for whole smoked ham was 13.1 percent of the retail selling price, and for salt pork bellies 24.4 percent (table 49). Included in the table are only the pork commodities, smoked whole ham, sliced bacon (half pound package), salt pork bellies, and refined lard, (1 pound carton). These were all sold retail in the same form they were purchased wholesale by the dealer, except salt pork which was sold in smaller pieces but probably at a uniform price per pound. For beef, veal, lamb, and some pork cuts, the wholesale product obtained by the retailer is broken down into several kinds of retail cuts, which probably sell at several different prices. To compare the price of a specific cut with the wholesale price of the piece from which it is obtained, or to allocate arbitrarily a different wholesale price to each such retail cut and compare it with the retail price of the cut, would have little significance.

TABLE 49.—Average gross retail margins for several pork cuts, and lard, all types of stores combined, located in 23 cities in the United States, week ended August 18, 1942<sup>1</sup>

Commodity	Average selling price per pound	Average invoice price per pound	Margin <sup>2</sup>		
			Per pound	Percentage of selling price	
	Cents	Cents	Cents	Percent	
Ham, whole smoked .....	38.9	33.8	5.1	13.1	
Bacon, sliced, half pound package.	21.6	17.3	4.3	19.9	
Salt pork bellies .....	27.0	20.4	6.6	24.4	
Lard, refined, 1 pound carton.....	18.0	15.2	2.8	15.6	

<sup>1</sup> Includes independent stores of various sizes, supermarkets, and corporate chains.

<sup>2</sup> These gross margins, based on the difference between the selling price per pound and the invoice price per pound, do not make adjustments for spoilage, shrinkage in weight due to loss of moisture, and trimming of stale cuts.

Data obtained in the study of retail food margins made by the Bureau of Labor Statistics for the Office of Price Administration. (Unpublished.)

#### VARIATION IN MARGIN AMONG TYPES OF STORES

The average gross margin for selling meat at retail is not the same for different types of stores. The Bureau of Labor Statistics study

<sup>20</sup> See footnote 25, p. 76.

showed that, in general, average margins were lower for supermarkets and corporate chains than for independent stores (table 50). Among the independent stores, the small one tended to operate on lower average margins than those of medium and large size. However, the relationships among margins by different types of stores were not the same for the various cuts of pork products. In the study by the Bureau of Business Research for 1934, the margins for retail meat chains and for meat sides of combination chains were virtually the same (table 48).

TABLE 50.—Gross retail margin for five pork products by different types of stores in 23 cities in the United States, week ended August 18, 1942

HAMS, WHOLE, SMOKED, PER POUND

Type of store <sup>1</sup>	Stores included <i>Number</i>	Average selling price <i>Cents</i>	Average invoice price <i>Cents</i>	Margin <sup>2</sup>	
				Actual	Percentage of selling price
				<i>Cents</i>	<i>Percent</i>
Independent, small .....	175	39.2	33.7	5.5	14.1
Independent, medium .....	257	38.9	33.5	5.4	13.8
Independent, large .....	271	39.3	33.5	5.7	14.6
Supermarket .....	166	38.1	33.8	4.6	11.9
Corporate chain .....	201	38.3	33.7	4.6	12.0

BACON, SLICED, 1/2-POUND PACKAGE

Independent, small .....	245	23.4	18.8	4.6	19.8
Independent, medium .....	115	23.9	18.7	5.2	21.8
Independent, large .....	392	24.9	19.5	5.4	21.6
Supermarket .....	171	23.2	18.9	4.3	18.5
Corporate chain .....	247	22.5	18.3	4.2	18.6

SALT PORK, BELLIES, PER POUND

Independent, small .....	113	24.3	18.4	5.9	24.3
Independent, medium .....	176	27.2	17.6	7.6	27.9
Independent, large .....	176	27.2	17.6	7.6	27.9
Supermarket .....	85	24.1	18.2	5.9	24.5
Corporate chain .....	105	24.7	18.9	5.8	23.4

LARD, REFINED, 1-POUND CARTON

Independent, small .....	256	18.7	15.3	3.4	18.1
Independent, medium .....	276	18.8	15.3	3.5	18.5
Independent, large .....	332	18.5	15.1	3.4	18.1
Supermarket .....	114	16.5	14.7	1.8	11.2
Corporate chain .....	143	16.5	14.8	1.7	10.0

<sup>1</sup>The stores are classified on the basis of type and volume of sales in 1939, as follows: independent, small, under \$20,000; independent, medium, \$20,000 but less than \$50,000; independent, large, \$50,000 but less than \$250,000; supermarkets (chain or independent) \$250,000 or more per independent store, or average per unit of a chain in a given city; and corporate chain (4 or more units with combined annual sales of \$500,000 or more) having average annual sales per unit less than \$250,000. If average sales per unit is \$250,000 or more, the stores are classified as supermarkets. The classification of supermarkets by the Office of Price Administration for purposes of price regulation differs slightly from this in that it is based on sales of individual stores instead of average per unit of the chain in a given city.

<sup>2</sup>These gross margins, based on the difference between the selling price per pound and the invoice price per pound, do not make allowance for spoilage, shrinkage in weight due to loss of moisture, and the trimming of stale cuts. If these allowances were made, the actual gross retail margins would be less than shown in this table.

Based on unpublished data obtained in a study of retail food margins made by the Bureau of Labor Statistics for the Office of Price Administration for the week ended August 18, 1942.

ITEMS OF COST COMPRISING MARGIN

Salaries and wages were estimated at 13.9 percent of net sales in 1939, which was equal to 58 percent of the gross margin for retail meat

markets (table 44). In the Mitchell study (17), salaries and wages were equal to 60 percent of the gross margin, and in the Lindquist study (15) 53 percent. In these studies, the labor cost included both the salaries and wages paid the employed personnel, and a reasonable allowance to the proprietors as compensation for their services of buying, selling, and management. The most common amount allowed proprietors in the Chicago study was \$15 to \$50 per week, but the allowances ranged from \$35 to \$100 per week. In instances where the merchant owned his store building a reasonable charge was made for rent and this was included as expense. Depreciation in most cases was computed at 10 percent per year on the total cost of fixtures, machinery, and equipment. Where these were acquired at high prices before the depression, the original costs were reduced to current replacement costs, and depreciation was computed accordingly. Interest on the proprietor's investment or equity was not allowed for in expenses. The allowances made for salaries, rent, and depreciation in the Mitchell study are not reported.

The operating margin of retail meat markets constitutes a relatively small percentage of the value of sales when prices are high, and a relatively large proportion when prices are low. This is influenced largely by the payment of wages as wage payments comprise nearly 60 percent of all operating expenses. Wage payments, however, vary more over a period of time than such cost items as rent, interest, taxes and overhead, so it represents a slightly larger proportion of total expenses when

TABLE 51.—Retail margin in cents per pound sold at retail and percentage of retail dollar, distributed into principal components, 1925-34

Item	Value per pound sold at retail									
	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934
	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents
Value at retail.....	24.6	24.4	25.4	25.6	26.0	23.7	18.7	15.2	14.3	17.2
Margin for retailing function:										
Wages.....	2.8	2.3	3.7	3.4	3.3	3.0	2.5	2.7	2.6	2.9
Rent.....	.6	.5	.7	.7	.6	.5	.5	.5	.5	.5
Other expense.....	1.1	.9	1.1	1.3	1.3	1.2	1.1	1.2	1.0	1.3
Profit.....	.7	.6	.9	.9	.9	.9	.7	.5	.7	.5
Total margin.....	5.2	4.3	6.7	6.3	6.1	5.6	4.8	4.9	4.8	5.2
Cost at wholesale.....	19.4	20.1	18.7	19.3	19.9	18.1	13.9	10.3	9.5	12.0

Percentage of retail dollar

Item	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent
Value at retail.....	100	100	100	100	100	100	100	100	100	100
Margin for retailing function:										
Wages.....	11	10	14	13	13	12	13	18	18	17
Rent.....	2	2	2	2	2	2	3	3	4	3
Other expense.....	5	4	6	5	5	6	6	8	8	7
Profit.....	3	2	4	4	3	4	4	3	4	3
Total margin.....	21	18	26	24	23	24	26	32	34	30
Cost at wholesale.....	79	82	74	76	77	76	74	68	66	70

meat prices are high than when they are low. In the study by Tobin and Greer (24), wages made up 63.5 percent of the total operating expenses in 1929 when the average selling price of meat was 31 cents per pound, 59.6 percent in 1933 when the average price for meat was 14.7 cents per pound, and 60.0 percent in 1939 when the average price of meat was 22.0 cents per pound. These figures are based on data given in table 51.

### REDUCING COSTS AND IMPROVING EFFICIENCY OF MARKETING AND PROCESSING LIVESTOCK AND MEAT

Of the total margin for marketing and processing livestock and meat in 1939, the retailing function absorbed 49 percent and the wholesaling function 12 percent. These figures are based on data shown in table 3 and figure 4. The margin going to meat packers for slaughtering and processing was 30 percent. The marketing of livestock, including its transportation, was about 9 percent of the total margin.

It is well to keep these relationships in mind when considering the question of reducing the margin between the price the producer receives for livestock and what the consumer pays for meat. It does not follow, of course, that a margin that is normally large for performing a given function, is easier to reduce than a margin that is normally small for performing some other function. But it is obvious that a given percentage reduction is more significant if applied to a relatively large margin than a smaller one. For example, a 10-percent reduction in the cost of retailing meat would be as significant in relation to the total margin as a reduction of more than 50 percent in the cost of marketing livestock. Conversely, a reduction of 10 percent in the cost of marketing livestock would be equal to less than a 2-percent reduction in the margin for retailing meat.

The margins for marketing livestock and meat largely depend upon the channels through which the animals and products move from the producer to the consumer, on the marketing services performed, and on whether these services are provided by others, and paid for, or are furnished by the farmer who produces the livestock, or by the consumer who purchases the meat.<sup>27</sup> The margin for meat packing is affected greatly by the extent to which meat is processed, and by the type of processing.

Farmers who slaughter their own livestock and sell the meat direct to consumers may not pay for any service; therefore they receive the full amount the consumer pays. In like manner, a consumer who buys a live animal and slaughters, may not pay for the processing and distributing of the product. Obviously, these methods of selling and buying have their limitations, and for commercial purposes are generally not considered practicable.

Margins for marketing and processing livestock and meat could be reduced by providing less service or by having the service performed more efficiently and at less cost. Whether any existing service is unne-

<sup>27</sup> As pointed out earlier when estimating the cost of marketing livestock and meat, no compensation is allowed for the time producers devote to marketing their own livestock, or to the time consumers devote to buying meat.



essary, wasteful, or unduly expensive is naturally important. Reduction in margins might also be brought about by modifying present methods and practices. References to reducing margins are based on existing wage and salary levels. As direct labor cost comprises more than one-half of all costs of marketing and processing, and as the cost of labor is a considerable proportion of the cost of equipment, facilities, and supplies used, any change in the wage and salary levels might materially alter the present margins.

A marketing system that is efficient and equitable to the producer must have something more to recommend it than the mere fact that it performs the various marketing services at low cost. The system should be so organized and administered that the producer is paid for his livestock on the basis of its quality. At present a considerable quantity of meat is federally graded before it is sold to consumers. The Federal grading of meat will likely decrease if the compulsory requirement is removed, but official grading of meat is expected to be relatively more important than it was before the compulsory provision was made effective.

The price the consumer pays for meat of a given grade should be reflected in the price the producer receives for the live animal that produces meat of the same grade. Moreover, as the relative prices at livestock markets continually change, the farmer should have access if possible to such information as will aid him in choosing among alternative markets the one most satisfactory for the kind and quality of livestock he has to sell at a given time.

Several suggestions have been made for changes in methods and practices of marketing livestock and meat, and in meat processing, which might serve to reduce marketing costs and encourage the payment for livestock more nearly on the basis of its quality. These should be given careful consideration by the livestock and meat industry. They will be discussed under the broad functions of marketing livestock, meat packing, transportation and storage, wholesale distribution of meat, and retail distribution of meat. Some of the suggestions affect the operations concerned with more than one of these functions.

## MARKETING LIVESTOCK

### SELLING LIVESTOCK ON BASIS OF UNIFORM GRADES

When the housewife buys ungraded meat she has to rely mainly on her own judgment as to its quality. If the meat is federally graded and stamped, on the other hand, she has reasonable assurance that its quality agrees with the grade indicated. Some processed and fresh meats have been stamped with the packer's brand in the past, but these have usually been the meats of better quality.

The Office of Price Administration and the War Food Administration, in operating the food and price control programs, made the Federal grading of beef, veal, lamb, and mutton compulsory in 1943. Federal grading of these meats had been on a voluntary basis. The Federal grading of pork was continued on a voluntary basis.

Of the total beef produced in commercial plants in the United States, only 8 percent was federally graded in 1940 (fig. 9). The voluntary grading of meat increased moderately in 1941 and 1942. In 1943 the

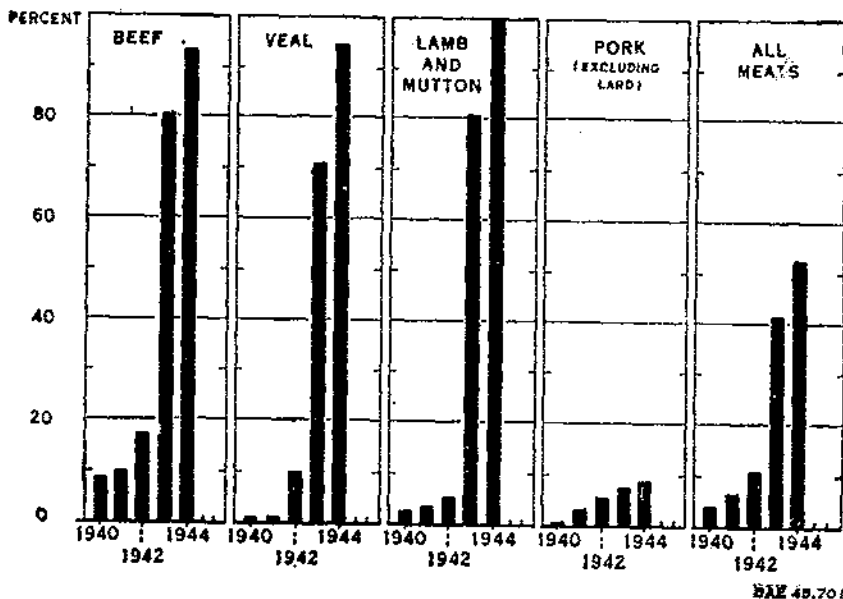


FIGURE 9.—FEDERALLY GRADED MEAT AS PERCENTAGE OF MEAT OBTAINED FROM COMMERCIAL SLAUGHTER (EXCLUDING FARM SLAUGHTER) IN THE UNITED STATES, BY SPECIES, 1940-44.

Federal grading of beef, veal, and lamb and mutton was made compulsory in 1943 which accounts for the sharp increase in the proportions graded last year. Relatively small quantities were sold ungraded on account of lack of available grading service. Federal grading of pork has continued on a voluntary basis.

Data on meat graded from Production and Marketing Administration.

federally graded beef amounted to 81 percent of the total produced in commercial plants, and in 1944, it reached 93 percent. The federally graded veal increased from 10 percent of total in 1942 to 94 percent in 1944, and the federally graded lamb and mutton from 5 percent to 100 percent. The proportion of the federally graded pork was 5 percent in 1942, and 9 percent in 1944. Federally graded beef, veal, and lamb, and mutton in 1944 were in excess of the volume slaughtered in plants under Federal inspection that year. An equivalent of only 10 percent of the total pork slaughtered in plants under Federal inspection that year was federally graded.

What the situation will be with respect to the Federal grading of meat when the wartime controls relating to prices and allocation of supplies have been terminated is uncertain. However, the feeling seems to be rather general that since consumers have become more accustomed to buying graded meat during the war the demand for federally graded meat will considerably increase in the future.

Payment for livestock on the basis of quality should be facilitated either by (1) selling the animals on the basis of carcass grade and weight, the grades to be uniform, and the grading to be done by Federal graders, or (2) requiring that the animals be graded alive according to Federal standards that are designed to be comparable with the grades of meat produced. There is strong indication that if either of these

arrangements were in effect the animals of high quality would command higher prices than they do when sold in some mixture, which now is not uncommon; and those of poor quality would be discounted. This in turn would serve to encourage the production of more animals of better quality.

*Selling Livestock on the Basis of Carcass Grade:*—When livestock is sold on the basis of carcass grade and yield the seller and buyer agree on the prices to be paid per 100 pounds dressed weight for carcasses of various grades and weights, but the specific price that will apply is not determined until after the animal is slaughtered and the carcass is graded and weighed (8). In the case of cattle, calves, sheep, and lambs, the hide, skin, and pelt also need to be valued, and either paid for separately or be included in the price of the carcass. Selling hogs on the basis of carcass grade and yield has been practiced in Denmark, Great Britain, and some other European countries for many years. It has been in effect in Canada since 1934.

The principal advantage of selling livestock on the basis of carcass grade and yield is that the carcass can be valued more accurately than the live animal. Appraising the value of an animal on the hoof necessitates estimating both the dressing yield and the grade of the carcass it will produce. The dressing yield of an animal is determined by its feed and water fill, its conformation, and its individual characteristics. To estimate the value of the carcass an animal will produce becomes still more difficult when parts are bruised or diseased, or in the case of hogs that yield soft or oily pork, because detection may not be possible until after slaughter. Even if bruises or soft and oily pork are detected in the live animal, it may not be possible to determine the extent of the adjustment in price that is equitable until the animal has been slaughtered and the carcass is weighed and graded.

Inability to estimate accurately the dressing yield of the animal and the grade of the carcass, tends to affect returns to producers differently than it affects returns to packers. A packer who is buying animals in large numbers can readily determine the average yield of his purchases, as he can check records of previous purchases. He is guided by these averages even if there are serious errors in estimating the dressing yield of particular animals, or of particular lots. The individual producer who sells infrequently, on the other hand, may be greatly affected if the yield of the animal he sells is incorrectly estimated.

Packers can also determine from past records the average loss resulting from bruising, and can take this into account when making purchases, even if the individual animal that is bruised cannot be identified. In using these averages the packer buyer overestimates some lots and underestimates others. As a result, those who sell animals that have high dressing yield, or animals that are uninjured, are required to share in losses with those who sell lower yielding or bruised animals.

Among practical problems that will need to be overcome if such a system of marketing is to be put into effect in the United States, is that of maintaining the identity of the animals until they are dressed, graded, and weighed. In Canada, tattooing hogs with an ink that does not fade or spread in the slaughtering process has been found to be satisfactory.

The tattooing of hogs was practiced to a limited extent in certain sections of the United States during the campaign to eradicate bovine tuberculosis following World War I (2). At that time, many packers, in order to encourage the control of tuberculosis among hogs, agreed under certain conditions to pay producers 10 cents per hundredweight additional for butcher hogs bred and fed in counties that had been declared tuberculosis free. The tattoo mark, visible after the hog was slaughtered, served to identify the owner and his location. With cattle and sheep some other means of identification must be applied. Ear tags may be practicable. Metal ear tags have been used successfully for identifying animals sold subject to inspection after slaughter.

Under this plan, full settlement must be delayed until the animals have been slaughtered and the carcass have been weighed and graded; but part payment may be made at time of purchase. This plan will require more detailed records than when animals are bought outright. The maintenance of proper records should not be difficult when animals are delivered direct to the slaughtering plant. The problem will be greater, and final settlement might be delayed somewhat, when animals are sold through public markets, and especially if they are slaughtered at plants located in other areas.

Weighing and grading hog carcasses should not be difficult, except that it might require rearrangement in some plants. Scales so designed and placed that they automatically weigh carcasses as they move along the rail after being dressed are common. The grading probably could be done at this point. The grader could examine and stamp the carcass as it passes along the rail to the cooler. The grader would probably need to be employed either by an official or semi-official agency.

The cost of handling hogs bought for slaughter on the carcass grade-and-yield system is moderate, as indicated by the experience in Canada. According to estimates based on operations there, the approximate cost on a daily run of 4,000 hogs would be about 2 cents per hog, or about 1 cent per 100 pounds live weight (22). On a run of hogs smaller than 4,000 per day, the cost per hog probably would be higher. Among the compensating factors in cost would be the saving in feed given animals preceding sale, as "fill" would no longer be economical if hogs were sold by carcass weight.

By this method of trading in slaughter livestock, a farmer will be paid for his animals more nearly on the basis of the quality of meat produced. If livestock is to be sold on the basis of grade, it is generally recognized that the grade of the meat can be more accurately determined in the carcass than in the live animal. What the cost of marketing livestock on the basis of carcass grade and weight would be, compared with the present system, is not known because comparative data are not available. The grading service would add to the cost, but feeding before selling would be decreased and this would reduce the cost of feed.

A modification of this arrangement is to sell livestock on a basis of guaranteed yield. By this method animals are paid for according to their live weight, and a certain dressing yield is guaranteed. If, after the animals are slaughtered, the yield is found to be higher than that guar-

anteed, the price per hundredweight is increased in accordance with a schedule previously agreed upon. If the yield is lower than that guaranteed, the price per hundredweight is decreased accordingly. This method was first used by the Fayette Producers' Company, Washington Court House, Ohio, in 1923 when selling hogs direct to Eastern slaughterers (8, 12, 14). The movement soon spread to other county associations in the eastern Corn Belt, chiefly in Ohio. These associations joined to form the Eastern States Company, with headquarters in Columbus, Ohio, which for several years sold hogs in considerable volume by this method.

*Selling Livestock on Basis of Live Grade.*—If slaughter livestock is not to be sold to packers on the basis of carcass grade and weight, the sale on the basis of live-animal grades should be carefully considered. At present, it is not required that livestock be bought and sold according to grade, although Federal grades are being used either unchanged or with varying degree of modification, as a basis for trading at some markets, and by some packers who buy direct. Much livestock, however, is sold without reference to Federal grade standards at average prices for lots containing animals of more than one grade. Failure on the part of selling agencies to sort livestock into uniform classes and grades before offering them for sale makes it difficult for producers to judge the value of their livestock, for market reporters to reflect the true condition of the market, and for producers to interpret the market reports.

Before all slaughter livestock can be sold effectively on the basis of uniform grades, several problems must be solved. The mechanics involved in sorting and grading animals, and training of graders, and the cost of grading all merit careful study.

#### BASIS FOR PRODUCERS TO CHOOSE MOST ADVANTAGEOUS LIVESTOCK MARKET

Most producers have the opportunity of choosing among markets when selling livestock. The choice might be made among individual markets of a given type, and among markets of different types. As prices at various markets change frequently, but do not change simultaneously and in the same amount, one market may be most advantageous for a particular class and grade of animal at one time, but some other market may be most advantageous at some other time. If farmers are to sell their livestock advantageously they should ascertain the probable prices at alternative markets and compare these, after consideration of the expenses involved at each market.

The cost of marketing is not the only factor to take into account in choosing markets at which to sell livestock. Markets of different types, and often individual markets of the same type, operate differently and perform different services. They are also located different distances from the farm. In choosing the most advantageous market, a farmer needs to take into account the price paid for the livestock, the cost of marketing, the services rendered, and his own ability to perform some or all of the marketing services effectively and economically.

The expenses paid by a farmer for marketing livestock can be reduced if he performs more of the services himself. The extent to which it is advantageous for him to delegate marketing services depends on many things, such as the specific markets available, the kind and quality of

livestock to be marketed, the prices paid at alternative markets, his ability to appraise the value of the animals, and the market expenses involved in delivering to and selling at each alternative market. Some farmers equipped with suitable trucks might find it advantageous to haul their own livestock to market if the number of animals sold at a given time is large enough to make an economical load, and if pressing farm work does not put too high value on their own time. On the other hand, if sale is in small lots, or if it is made at a time when important work on the farm must be neglected by the farmer who hauls his own livestock, it may be more economical to have the animals transported by a for-hire trucker who assembles livestock from several farmers in the community into economical loads.

#### CHOICE OF MARKET AIDED BY ADEQUATE MARKET NEWS

In order to be in position to select the most advantageous market for livestock, farmers need as complete information as possible on current prices and other market conditions at alternative outlets. They also need accurate market quotations by classes and grades which conform to Federal standards.

The Federal market news service for livestock now maintained at 29 public markets, and in three areas where information is collected and disseminated on direct marketing of slaughter livestock, has made a specific contribution to livestock marketing. However, careful consideration should be given to the advisability of expanding this service, particularly to areas where livestock is being marketed direct to packers, and to areas where stocker and feeder cattle and lambs are sold direct to feeders in relatively large numbers.

In the Iowa-southern Minnesota area the hog market at important packing plants and concentration yards has been reported currently since 1929. On July 1, 1945 the service was extended to include the reporting of receipts and prices of sheep and lambs in the area. Consideration is now being given to reporting receipts and prices of cattle and calves. The eastern Corn Belt States comprise a wide area where direct marketing is relatively important and where a well-administered market news service should contribute to better marketing procedure. There is also need for a current market news service for stocker and feeder cattle and feeder sheep and lambs sold direct by producers in the Range States to feeders in other areas. For several years before the war, more than one-third of the stocker and feeder cattle, and more than two-thirds of the feeder sheep and lambs moving into the Corn Belt States were marketed direct, and on these only limited market information was available.

The existing market news service might be re-examined in light of the changes in marketing methods and practices that have taken place during the last 10 to 15 years. Resulting improvement might apply to wholesale meat markets as well as livestock markets. Reports regarding wholesale meat are now issued only at 3 markets. It might strengthen the service considerably if additional important wholesale meat markets located in other areas were included.

**ELIMINATION OF CERTAIN WASTEFUL AND INEQUITABLE  
MARKETING PRACTICES**

Marketing practices that are generally considered inequitable or uneconomical are found at some livestock markets. This applies particularly to the practice of "filling" livestock to increase its weight before it is sold, and docking stags and "piggy" sows. Both practices grew up during the early history of the public markets and have persisted to a considerable extent even under changed marketing conditions.

The practice of filling livestock by feeding and watering before selling, common at most of the larger markets and at many smaller ones, should be discontinued. Such feeding as may be advisable for humanitarian reasons is excepted (25). Otherwise the practice is wasteful of feed, and under normal conditions will not increase total net returns to producers. Before the war, reduced quantities of feed were being given at most markets, and at some markets feeding was largely discontinued. Selling without feeding was more common for livestock received from relatively nearby areas by motortruck than for shipments coming greater distances by rail. However, with hogs selling at ceiling prices during the war, feeding before selling became advantageous, and this feeding increased.

Docking stags and piggy sows to offset somewhat their undesirable characteristics as slaughter animals, followed at many markets, should be discontinued (25). Instead, such animals should be bought and sold on their merits at actual weights, as is now done in the case of cattle and sheep. When this practice is followed, the weight dockage applied to stags is generally 70 pounds. With piggy sows, a dockage of 40 pounds is applied unless a smaller amount is agreed upon between buyer and seller. To apply a fixed dockage to stags and piggy sows is inequitable, for the degree of stag characteristics and the advancement of pregnancy of sows vary greatly among individual animals. Dockage of stags and piggy sows has been discontinued at many markets. The change became effective at some markets during the war, in order to permit payment for such animals to be increased, while the price was limited by established ceiling.

**REDUCING NUMBER OF LIVESTOCK MARKETS**

The large number of markets and agencies for handling livestock (figs. 7 and 8) apparently is considerably in excess of needs. Hence many operate at only part capacity, and at high cost. Inefficient markets are probably found among all types. If the high-cost operators among country livestock dealers, local cooperative associations, concentration yards or local markets, auctions, public stockyards, commission agencies at the public stockyards, and packers who purchase direct could be eliminated, the cost of marketing livestock could probably be reduced. Although high-cost operation is often associated with the handling of small volume, it does not necessarily follow that all small-scale operators are inefficient. Nor does it follow that if only the large-size markets operated the marketing system would be more efficient. As an example, some small markets are now located where large markets would not be needed, and would therefore be uneconomical. If markets were limited

to those of large size, the average distance from farm to market would be increased, and this would add to the cost of transportation. It might also result in added shrinkage of livestock in transit and uneconomical routing of many shipments. A leading reason why livestock markets are so numerous is that many farmers prefer to sell near home, some to one type of market and some to another.

That the livestock marketing situation would be improved if the inefficient high-cost agencies and markets were discontinued is probable, but whether they should or could be required to close either by legislation or by edict, if their business is operated legitimately, is open to question. But inefficient markets should not be granted subsidies or special favors for the purpose of maintaining them in business.

### MEAT PACKING

The technique of performing slaughtering operations is generally highly standardized at the large and medium-sized plants, but operations may be somewhat different at some of the smaller plants.

With processing, marked variation is found among plants even of the same size. This applies both with respect to the volume of products processed, and the type of processing done.

Slaughtering, dressing, and cutting operations in meat-packing plants are conducted at relatively low costs, but later operations have not been mechanized and streamlined to the same extent. Even the cost of slaughtering and cutting operations are relatively high in some old plants that are badly arranged and have inadequate and obsolete facilities.

Since World War I, the trend in slaughter has been away from plants located in the East to plants in areas nearer the source of supply of livestock. Another trend has been from the larger market centers to smaller cities and towns in the interior. These shifts have probably been responsible for the development of many up-to-date plants in the areas where they have been established or expanded, but modernization has not taken place to the same extent in areas from which slaughtering has been shifted. To replace old, inadequate, and obsolete plants with new and modern ones would no doubt make them more efficient, but would also require considerable new capital for investment.

The cost of operating meat-packing plants depends largely on the amount of processing that is carried on, and on the type of processed products produced. The production of specialties like sausage and canned meat may entail an over-all cost up to 10 or 12 cents per pound. The conversion of cattle into dressed beef carcass on the other hand may cost only around 1 to 1½ cents per pound, and pork may cost considerably less. The average cost of producing meat in a plant is a composite of numerous operations, some simple and some complex. In a packing plant that has a balanced production of various items, the composite cost may be between 2½ to 3 cents per pound for the entire output, exclusive of the cost of distribution.

The cost of processing could be lowered by producing less processed products. However, over a period of years in the past, the trend has been in the opposite direction. Both retailers and consumers have demanded more processing instead of less. This is evidenced by the growth



in popularity of sausage, canned meats, and prepared cuts. There is no indication the trend toward increased processing will be reversed within the next few years.

Labor absorbs about half of the total expense of meat packing. For several years the trend has been toward higher wages, and this is likely to continue. The labor cost of production, however, has not advanced as much as wage rates, due to improved efficiency in the management of labor forces. As it is not expected that efficiency in labor will increase faster than wages, reduction in cost of slaughtering and meat processing cannot be expected from this source. On the other hand, if increases in wage rates should outrun increases in productivity of labor, the relatively high slaughtering costs could lead to an increase in farm and retail slaughter.

A considerable item of cost is for wrapping and packaging. The trend of demand has been towards more packaged products and more costly packaging. Newer containers, more attractive to customers, will probably be developed, and this is likely to increase packaging costs. Better packaging, however, may actually result in net savings in the over-all cost by reducing shrinkage and spoilage. These items are important in the meat industry and may be considered costs, although they do not appear as expenses on the packers' books. Very little meat actually spoils in a packing plant, but there is a substantial loss from moisture evaporation, and some of this is preventable. Proper packaging, coupled with rapid turn-over of production and effective temperature and humidity controls, can hold shrinkage at a minimum.

Other packing-house expenses are mainly of small amounts per unit of output, no one more than a fraction of a cent per pound. This includes power services, such as water power, steam, electricity, refrigeration, etc. Efficient plants show much lower cost for these items than inefficient ones and this is also true of some other expenses. The differences are negligible, however, in terms of the over-all processing cost per pound and are more likely to be reflected in the profits of the individual unit than in the price structure of the industry.

If all packing plants were as efficient and as economical as the best of the present plants, meat-packing operations would probably be carried on at less cost. What this reduction would amount to is somewhat problematical, but members of the industry doubt if savings could exceed an average of one-half cent per pound. This saving would be equal to a reduction of the total margin of more than 4 percent on the basis of 1939 costs. If the frozen-meat industry should develop, the cutting, boning, packaging, and freezing would probably be carried on at the packing plant and this no doubt would increase operating costs materially. But these added costs might be entirely or more than compensated for by reduction in the cost of wholesale and retail distribution of the product, if the elimination of bone and waste is considered. (See p. 99 for discussion of the marketing of frozen meat).

#### TRANSPORTATION AND STORAGE

Meat must be carried from the place where it is produced to the place where it is wanted, and must be held from the time it is produced

to the time it is wanted. As these operations are fairly closely related they will be considered together, although storage is also associated with meat production. Transportation and storage operations involve costs which vary both by locations and types of products.

The cost of transporting meat (that is inter-area movement as distinguished from local delivery within an area) varies from zero in the case of products consumed locally to as much as 2 to 2½ cents per pound on some shipments like pork from the western Corn Belt to the Pacific Coast, and beef from Texas to New England. Typical cost on heavy-volume movements, such as fresh meat from the Middle West to the Eastern Seaboard, are from 1 to 1½ cents per pound. An average transportation cost for all meat combined would probably be in the neighborhood of three-fourths of a cent per pound, but such average is of little significance.

The principal improvement in transportation in recent years has been in the nature of greater speed of trains and motortrucks, which has had the effect of reducing shrinkage and spoilage in transit. There appears to be relatively little waste of transportation of meat through cross-hauling. The direct lowering of transportation expense by any significant amount seems unlikely, except in certain areas. The Interstate Commerce Commission did authorize a reduction in the rate for meat shipped from the Middle West and the range States to the Pacific Coast, in June 1945. If further rail-freight rates are adjusted, it is not certain that they all will be downward. Truck rates might increase instead of decrease as motortruck equipment is becoming more expensive and labor rates are likely to be higher than they were before World War II.

The increased slaughter in plants located in the producing area has increased the shipment of meat to consuming centers on the Eastern Seaboard. However, the increased transportation of meat has been more than counterbalanced by the reduction in the transportation of live animals. Indications are that slaughtering in the producing area will continue to increase.

In normal times, surplus production of meat during peak periods is stored, usually in a freezer, until production is lower. Thus storage spans time as transportation spans distance. This stabilizing operation entails a cost which may run 1 to 1½ cents per pound. It involves only a small fraction of the total meat since the great bulk is consumed within a short time after it is produced.

Freezer storage and handling to and from public freezers, is an occasional and noncontinuous operation and is relatively costly per hundred-weight. In spite of the relatively high cost this method is being used to some extent because it would not be practicable for each packing plant to maintain all of its own freezers with a full pack-load capacity which normally would be used only a few months during the year. When the extra storage expense is spread over the total meat production the aggregate cost is small. The reduction possible in costs of transportation and storage could hardly exceed one-fourth cent per pound and is likely to be less.

If the marketing of frozen meat to consumers becomes important the storage costs will probably increase considerably, but costs of retailing

would decline. The low-temperature refrigeration required for both storage and transportation probably would also necessitate decided changes in the facilities and equipment if they are to become efficient.

#### WHOLESALE DISTRIBUTION OF MEAT

Wholesale distribution of meat, as used here, refers only to the functions of obtaining and handling orders and performing local warehousing and local delivery, although long-distance transportation of meat was included as a wholesaling operation in the analysis of the report. The transportation phase was discussed in the preceding section.

The cost of wholesaling meat varies from as little as  $\frac{1}{2}$  cent to as much as 3 cents a pound. The most common costs for all types of local distribution is probably between 1 and  $1\frac{1}{2}$  cents per pound. The variation in cost is due primarily to the size of the order, which in turn tends to be associated with the method of distribution employed.

Economies in this field depend largely on reducing the number of sales solicitations, orders, and deliveries required to distribute a given quantity of product. Large-volume sales result in low costs and small-volume sales entail high costs. The demand of some retailers for frequent solicitation and delivery, coupled with the competitive selling efforts of wholesale distributors tend to produce a distribution system that is needlessly expensive. Curtailment of excessive service would reduce distribution costs, but this is not always practicable. As retailers wish to keep inventories low, they ask for frequent small deliveries. In normal times, a store of moderate size may receive deliveries from three or four suppliers once a day, or sometimes even oftener. Salesmen from each supplier may visit the store four or five times a week, and call the retailer on the telephone to solicit orders between personal calls. This naturally makes costs high.

Handling large quantities of products at one time would be more economical, but this may require larger and better refrigeration facilities in the retail store. Concentration of purchases among fewer suppliers would also reduce costs, but dealers dislike to become dependent upon only one or two wholesalers. Credit extension is a consideration, as the retailer may obtain more credit from a half-dozen suppliers than from one or two.

Selling and delivering to the larger stores such as supermarkets normally is comparatively inexpensive, for the individual orders are usually large. Similarly, purchases by chain stores, which operate their own warehouses and combine all orders for a single store into one delivery, can be handled at relatively low expense. Small stores sometimes obtain at least part of the advantage of large-scale buying by combining into buying groups. The trend in retailing operations toward larger units, very evident in the big metropolitan centers, has probably meant some saving in costs of local wholesale distribution. In part, the costs of local warehousing have been merely transferred from the wholesaler to the retailer, but in large measure there has been a genuine economy in the function of taking and delivering individual orders. To the extent that this trend continues further economies may be possible. The potential saving is probably about  $\frac{1}{2}$  cent per pound, which would be equal to a reduction in the total margin of about 2 percent.

## RETAIL DISTRIBUTION OF MEAT

The high retailing margin for meat, which is normally about half of the total marketing and processing margin, is due chiefly to the peculiar character of the business, which is in part a processing and in part a distribution operation. Most meat comes to the retail market only partly processed. The butcher is not merely a salesman, but also a converter of raw material into finished products. The combined operation necessarily is relatively expensive, as it involves the selling of service by a workman who also must be a skilled mechanic.

The amount of processing required in the retail store varies with the kind of product. Beef, veal, and lamb must be broken down from the carcass or side to primal cuts, then into consumer portions. Pork loins, hams, shoulders, and other cuts must be chopped, sliced, or trimmed. Lard, sausage, and canned meat may be sold without further processing. The margins for some of these products are indicated in a preceding section (table 49).

The question as to what savings could be made in retailing meat, which during prewar years ranged from 20 to 30 percent of the selling prices, is significant. About half of the cost of retailing is for labor in the retail shop; savings there seem unlikely. But the reduction of labor costs by means of better use of the butcher's time offers a possibility, particularly in the larger shops. Although the average butcher may keep busy, he does not spend all his time on the skilled operations which warrant his fairly high wage rate. A large share of his time is taken in helping housewives select their meat, weighing it, wrapping it, making change and doing other work that could be done as well by a less skilled clerk at lower wages.

To organize the shop so the butcher can spend his entire time on meat cutting, boning, and trimming, while someone else does the remainder of the work, requires a retail business large enough to support two or more employees. Some of the larger meat stores now are realizing such savings.

Many meat shops normally operate at a very low percentage of the potential volume. Many hours and some whole days see only a few customers in the store. Then when a peak period arrives extra clerks are needed to take care of the trade. Larger volume also helps to reduce other operating costs per unit of product. This might mean a concentration of the business in the hands of fewer, larger stores, using the butchers' surplus time on off periods for preparing cuts to be sold at peak periods.

Savings could also be made if the consumers' buying could be spread more evenly over the week. This means teaching consumers to spread their buying over the slack period, or persuading them to do so by offering price concessions at appropriate times.

Decreasing operating expenses through reduction in the services provided is possible in some stores. Among these services are delivery and credit. Relatively large self-service retail meat markets are being operated in some sections, some handling the regular fresh cuts of meat, others handling frozen packaged meat. Some stores have been operated at an expense of as little as 3 cents per pound, compared with an average in

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normal times of from 5 to 7 cents per pound. An average reduction for the entire retailing function of as much as 1 cent per pound should not be beyond the bounds of possibility. This would constitute a reduction of the total marketing and processing margin by nearly 9 percent, on the basis of 1939 costs.

#### CONSOLIDATION OF SOME MARKETING AND PROCESSING FUNCTIONS

The preceding discussion has dealt with the individual marketing and processing functions as now generally performed. The question may be raised as to how the consolidation of some functions might contribute to more efficient operation and to the reduction in operation costs.

Suggestions have been made that farmers should operate packing plants in order to retain control of the livestock until the animals are slaughtered and the meat is processed. But this does not receive much encouragement when examined in the light of past history of the operation of cooperative or farmer-owned packing plants. Between 1914 and 1920, 17 cooperative or farmer-owned packing plants were promoted and organized<sup>28</sup>. Seven others were organized between 1930 and 1938. Only one of the 24 plants is still operating. Several of the organizations never opened their plants for business and most of those that operated continued less than 3 years. Large sums of money were lost by farmers through this movement.

Packers now do most of their own wholesaling and indications are that this arrangement has advantages with respect both to the physical distribution of the product and to performing the operation at relatively low cost. The question may be raised regarding the advisability of packers extending their operations to include the retail distribution of meat.

Retail selling of meat by packers has been relatively unimportant. A few small and medium-sized packing companies operate one or more retail stores, and some retail meat at their plants. The four largest packing companies are barred from distributing meat at retail by the Consent Decree which became effective in 1920. (8)

During World War II, the practice of operating meat-packing establishments and retailing of meat by the same concern increased, primarily because retail chain organizations acquired packing plants. At the close of World War II, more than 20 retail chains, both national and local, operated one or more packing plants. Whether this movement will expand or will even be maintained when conditions become more normal, will probably depend on whether the operations result in economies. Aside from that, there may be public opposition to the large chains engaging in meat packing, lest it tend towards monopoly, just as opposition developed earlier against the large packing companies engaging in the retail business.

On the other hand, if it seems desirable for retailers to operate packing plants it might be equally desirable for packers to engage in the retail business. This is a question which may involve public policy, so the answer will not be determined entirely on the basis of the economies involved. Whether the over-all expense of processing and distribution of

<sup>28</sup> Mann, L. B. History of Cooperative and Farmer Owned Meat Packing Enterprises in the United States. Cooperative Research and Service Division, Farm Credit Admin., Misc. Report No. 73, 20 pp., 1944. (Processed).

meat would be substantially affected by having these functions performed by the same concern is uncertain.

A change that might be important would be to have some of the processing now done in the retail store transferred to the packing plant. If packers could complete the preparation of meat in consumer-style units of sale, and put up the meat in suitable packages, the entire structure of present-day meat retailing might be changed. If this were done, it probably would be through the medium of pre-cut frozen meat, or cooked meats wrapped or placed in cartons which would furnish protection and make economical handling possible.

#### MARKETING FROZEN MEAT

The preparation, distribution, and sale of fresh meat in frozen form to consumers would greatly modify processing and meat distribution. Adoption of this method of merchandising would expand operations at the packing plant; some changes would be required in the refrigeration of meat in transit, in storage, in the retail market, and in the homes; and some changes would be made in the retail distribution of meat. That these changes would result in a net reduction of the aggregate marketing and processing margin between the packing plant and the customer is not unlikely. In any event, some shifts would take place in the relative margins of different agencies handling the product owing to modifications of their functions.

If fresh meat were sold in frozen form the services performed at packing plants would be greatly increased. This would include the preparation of retail cuts, which would involve a large amount of boning and trimming. The cuts would be wrapped, packaged, graded, labeled, and frozen at the plant. Trimmings from the cutting could be made into ground meat, sausage, or other prepared meats, and these also would be frozen at the plant. By shifting the preparation of consumer cuts from the retail market to the packing plant, the work could probably be done more efficiently and more economically. Professional retail-meat cutters operating in the packing plant, could then devote all their time to boning meat and preparing cuts. Trimmings from cutting operations could be utilized to better advantage because of the greater volume, and because the products made from trimmings could be sorted, graded, and standardized. Bones, waste fat, and other inedible products could be more fully salvaged in the plant than in retail markets.

The cost of transporting frozen, boned, and packaged meat under refrigeration should be materially less than that of unboned carcasses and wholesale cuts, primarily on account of the reduced weight, even after allowing for the increased cost of maintaining lower temperatures. As shown in table 24, the bone, ligament, and tendon in a beef steer carcass of Good grade is about 18 percent, and in a lamb carcass of the same grade, 24 percent. In the carcass of a hog weighing 200 pounds alive, bone and skin equal about 21 percent of the weight; but it is not assumed that all meat will be boned. Then, too, frozen packaged meat could be loaded much more advantageously for transportation in refrigerator cars and motortrucks than fresh carcasses and wholesale cuts. In frozen form, the loss from spoilage and deterioration in quality, and from shrinkage in weight, should be negligible.

Reduction in the cost of retailing frozen fresh meat compared with present methods of handling fresh meat should be substantial. By having the meat prepared and packaged at the packing plant the services of professional meat cutters would not be needed in retail stores. Packaged meats could be retailed through either self-service or service stores in about the same manner as dairy and poultry products. The reduction in retailing costs probably might more than offset the added cost of processing. On the other hand, low-temperature refrigeration equipment for the storage and display of frozen packaged meat would be needed, and this would add to both capital investment and operating cost for refrigeration in most stores, although this is not a large item over a period of years. Opposition to such arrangement from the unions of meat cutters might be encountered.

Freezing meat and selling it in frozen form to consumers should facilitate the more uniform distribution of meat throughout the year. In this regard it would serve the same purpose as that of curing and smoking hams, shoulders, and bellies. Some of these pork cuts, after being processed, are withdrawn from the market during periods of heavy slaughter, and are added to the current meat supply during periods of light slaughter. By making the supply more even throughout the year, it also has the effect of reducing fluctuations in price.

It should be recognized that if fresh meat is to be sold at retail in frozen form, many changes will need to be made in its preparation and distribution. Technical problems pertaining to preparing frozen meat, grading, grade labeling, wrapping, packaging, refrigeration, storage, and distribution have received considerable study by the packing industry and by some distribution agencies in recent years. Consumer reaction to frozen meat will need to be given careful consideration. Moreover, the price relationships among cuts of meat may be materially changed, as some cuts when boned will have a high selling price per pound as compared with other cuts. If the sale of frozen meat has real merit, there is reason to believe that the problems will be solved.

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