J. H. Williams Papers

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Feb 9 1940

Swift & Company
Chicago

Agricultural Research Bulletin No. 18

Swift & Company Booklets

(Can be read in 5½ minutes)

SWIFT & COMPANY, Chicago, receives many requests for information. Booklets have been prepared so that these requests can be answered more thoroughly and promptly. These booklets are available to everyone requesting them and can be had in quantities by those in educational work. No charge is made for the booklets. There follows a brief description of each of these publications that is available:

Swift's Service to Producer and Consumer—A thirty-five page booklet, illustrated, describing the operations of the meat packing business. Included are discussions on the origin of Swift & Company, marketing of livestock, government inspection of meats, methods of distribution, by-products, and the human side of the business.

A Direct Road to Market—Figures, maps, and pictures show the production and consumption of butter, eggs, and poultry in the United States. Discussed are the methods used to move these products from the principal producing areas to the principal consuming areas.

Dairy and Poultry Products from Farm to Table—Contains a short history of the production, preparation, and marketing of dairy and poultry products in the United States, with an explanation of the developments leading up to modern marketing methods.

Marketing of Dairy Products by the Meat Packer, Nos. 1 and 2—Consists of two booklets. Therein are described the basic problems connected with the marketing of dairy products and how

the methods used by the meat packing business have helped to solve these problems.

Along the Road to Market—Describes in simple language the actual mechanics of transporting and marketing millions of pounds of meats, butter, eggs, poultry, and cheese. Contains a double-page map of the United States which illustrates the use of refrigerator cars and other marketing methods used by nationwide meat packers.

Agricultural Research Bulletin No. 1—A one-page explanation of the Agricultural Research Bulletin series.

Agricultural Research Bulletin No. 2, "The Story of Meat"—Discusses the use of meats as a food and as a sacrifice in early times. Describes and gives a short history of the livestock and meat industry in North America from 1538 to the present day. This bulletin also tells how many well-known meat cuts got their names and gives other interesting sidelights.

Agricultural Research Bulletin No. 3, "Cuts of Meat"—A four-page bulletin picturing the standard (Chicago style) wholesale and retail cuts of beef, pork, and lamb, and showing the part of the animal from which each cut is taken.

Agricultural Research Bulletin No. 4, "Cuts of Meat"—An eight-page bulletin containing forty-four photographs of the more important retail cuts of beef, veal, pork, and lamb.

Agricultural Research Bulletin No. 5, "About Wool"—Recounts the history and advantages of wool for clothing, and the methods used to manufacture wool into woolens, worsteds, and felts.

Agricultural Research Bulletin No. 6, "Cattle By-products"—Discusses the importance and preparation of cattle by-products in the modern packing house. A chart lists the principal by-products, the part of the animal from which each by-product is taken, and its more important uses.

Agricultural Research Bulletin No. 7, "Cuts of Meat"—Contains photographs and illustrations showing wholesale and retail cuts of beef, veal, pork, and lamb.

Agricultural Research Bulletin No. 8, "Food Values in the Diet"—Herein is pictured in an interesting way the nutritive value of meats, milk, eggs, vegetables, fruits, and other foods common in the diet.

Agricultural Research Bulletin No. 9, "The Significance of Jewish Holidays to the Livestock Producer"—Describes the important Jewish holidays, methods of preparing meat for the Jewish trade, and the effect of both on the market for livestock and meats. Included is a complete calendar of Jewish holidays from 1937 to 1946, inclusive.

Agricultural Research Bulletin No. 10, "Lamb By-products"—Sets forth the importance and preparation of lamb by-products in the modern meat packing house. A chart lists the principal by-products, the part of the animal from which each by-product is taken, and its more important uses.

Agricultural Research Bulletin No. 11, "Lamb Feeding"—The Colorado-Nebraska area is the most important lamb-feeding section in the United States. This bulletin describes the Colorado-Nebraska area and the feeding and marketing of lambs from that section.

Agricultural Research Bulletin No. 12, "Soap"—Gives the history of the use and manufacture of soap from early Roman times to the present day. Principal soap types are named and the method of manufacturing each is described.

Agricultural Research Bulletin No. 13, "Cuts of Meat"—Contains photographs of wholesale and retail cuts of beef, veal, pork, and lamb, and a short discussion entitled "Determination of the Carcass Yield for Each Kind of Livestock."

Agricultural Research Bulletin No. 14, "Hog Production and Pork Consumption in the United States"—Discusses the history of hog production, present production by states and geographical areas, principal hog markets, and information on pork consumption.

Agricultural Research Bulletin No. 15, "Cattle Production and Beef Consumption in the United States"—The information contained in this bulletin is on cattle and beef and is similar to that given on hogs and pork in Bulletin No. 14.

Agricultural Research Bulletin No. 16, "Packer Profits"—Discussion of profits in the meat packing business. Tables of figures show profits per hundred pounds of live animal, per hundred pounds of dressed meats, total profit of the business by years, and a comparison with the profits earned by other businesses.

Agricultural Research Bulletin No. 17, "Geography of Meat Production and Consumption"—Contains maps of the United States showing the production of cattle, hogs, and lambs, and the consumption of beef, pork, and lamb in all sections of the nation.

For copies of the publications described write to

Agricultural Research Division
Swift & Company
Chicago, Ill.

Printed in U.S.A. 560-0111

Additional copies of this bulletin are available upon request.

Swift & Company
Chicago

Agricultural Research Bulletin
No. 2
February, 1935

The Story of Meat

(Can be read in 15 minutes)

ONE dares not conjecture when mankind reached that point when cookery was first employed. One may only surmise that it was not long after the invention—or the discovery—of fire. That date is lost in the utter darkness of the past.

When our earliest records begin with the crude carvings of cave-dwellers in middle Europe and the monumental inscriptions of Egypt and Assyria, cookery was already a highly developed art. Almost all the primitive people had the legend in some form or other that the roast of sheep and goat was acceptable as an offering to their dieties.

Meat preparation among some of the ancient civilizations of Assyria was apparently considered of so much importance as to be semi-sacred; only the priestly order could engage in it. The Egyptians are recorded to have had food laws in which the priests were judges of meat. Among the Hebrew patriarchs of the earliest times, "burnt offering"—or roast—was a frequent sacrifice on their altars. It is well known that the stringent butchering regulations of the Israelites under Mosaic law are virtually in force among the Orthodox Jews of today.

Bo-bo Discovers Roast Pork

Charles Lamb, in his "Dissertation on Roast Pig," has told us, with witty fancy, how the world owes the discovery of roast pork to a naughty Chinese boy, Bo-bo. He accidently burned down his father's cottage, and with it a litter of young pigs was burned to death. Wondering what would happen when his father, Ho-ti, should return, Bo-bo "stooped to feel one of the pigs, burned his fingers and to cool them applied them to his mouth. Some of the scorched skin had come away with his fingers and, for the first time in the world's life a human being tasted crackling." Then the whimsical story goes on to say how "as often as the sow farrowed, so sure was the house of Ho-ti to be in a blaze"; how the practice spread all over China until some wise philosopher arose who discovered that it was not necessary to burn down the home to get roast pork. "Then began the first rude form of gridiron; roasting by the string or spit came in a century or two later, I forget in whose dynasty."

How Meats Got Their Names

In the same way, the common names for meats give us a peep into the odd way in which our language has grown up. After the Norman conquest of England, the language of the Court and what we should today call the "polite set" was Norman-French. But the common people, those who tended the cattle and hogs and sheep of the conquerors, continued to speak their native Middle English dialects. When their fatted animals were brought to the households of their feudal masters, Norman retainers served them under the names of "boeuf," "vielle," "porc," and "mouton"—beef, veal, pork, and mutton—names which then were the Norman-French for the self-same live animals that the native underlings called kine, calves, swine, and sheep. Gradually, when the fusion of the two races took place, which Scott's "Ivanhoe" has pictured so charmingly, the distinction became fixed. So it came about that our composite language acquired two useful sets of words to describe the live animals and their meat. Indeed, the modern French have borrowed back at least one term lent us by Norman-French. The "rostbif" of a Parisian restaurant is only an adaptation of "roast beef."

Early American Days

The cattle now in America came from two parent sources. One was the Mexican herd of early and dramatic origin; the other herd was brought together upon the Atlantic coast in more commonplace fashion through piecemeal importation from Europe.

Glance for a moment only at the more romantic branch of American cattle. Early in the sixteenth century, Hernando Cortes, Spanish conquistador, landed on the Mexican beach near Vera Cruz, with 16 military chargers and a few Andalusian cattle. After the first warlike successes, Cortes' men ceased to be soldiers and became settlers; diverting their animals from the prior goal of war, they set up the business of raising livestock—founding the wild Texas "Longhorn" tribe.

Indians Included Meat in Diet

Of more importance, however, has been the development of the Atlantic source of

American livestock. Meat from the native wild animals had, presumably, always formed part of the food of the aboriginal red Indians of North America just as it does today among the races of Central Brazil. Perhaps the first white settlers took some ideas from the Red Man, for quite early in the records of New England, one may read that farmers cured, smoked, and packed meats for the tradespeople and merchants of their communities.

Colonists Imported Meat Animals

Whatever methods the Colonists may have taken from the natives, they wisely did not depend upon wild animals for a supply of meat. To have abandoned the tried domesticated animals of Europe for the uncertain supply of the hunt would have been like giving up fire-arms for the Indian's bow and arrow. From the first the importance of meat was recognized. The earliest authentic record of swine importation into this country, however, was in 1538. These were brought from Cuba to Florida by Ferdinand de Soto. Newfoundland and Nova Scotia received cattle and hogs from Portuguese traders in 1553. Although some cattle reached Virginia prior to 1609, the first considerable shipment was in 1610. The first sheep were brought from England to Jamestown, Virginia, in 1609.

Early Days of Meat Packing

In New England, dairying, cattle feeding, and hog raising were carried on together. By the middle of the seventeenth century an important cattle industry had developed in the Connecticut River Valley. From the pastures of New Hampshire and Vermont large droves were annually driven south to be sold at Boston or to feeders and dairymen in the three southern New England states. By about 1772, settlers from Virginia and Pennsylvania had reached the Monongahela Valley, where herds of 400 or 500 head were soon common.

Though hogs were brought by the first settlers to supply their own daily meat, they soon became an article of trade and a source of income. Early chronicles show that several of the northern colonies exchanged a surplus of pork with the West Indies for sugar and rum. But in the 1640's when the Civil War of Cavalier and Roundhead was absorbing the utmost resources of English merchants, the Colonists took over the whole trade of supplying the West Indies with livestock, barreled beef and pork, bacon and hams. The meats were "packed"; that is, "salted down" and packed in barrels. The first American to give his whole time to the business of "packing," so far as can be known, was William Pynchon, of Springfield, Massachusetts. The name "packer" has been used since that time, although "packing" comprises only a small part of modern meat preparations.

Marketing Corn on the Hoof

Following 1812, agriculture developed rapidly in Ohio, Kentucky, and Tennessee. The most important products were corn, hogs, and cattle, and the first named was marketed principally in the form of livestock driven afoot to market.

In the Ohio River Valley, farmers found that large crops of corn could be raised easily and cheaply. As they had no local market for this corn, they fattened cattle and drove them across the Allegheny Mountains to the eastern markets, where they competed successfully with cattle feeders of the East. Even hogs were driven east to Philadelphia and Baltimore and south to the cotton-producing regions.

Slaughtering for shipment down the Ohio and Mississippi Rivers to New Orleans, where the meat was consumed or reshipped to Atlantic coast points and abroad, began about 1820. As early as the year 1840, commercial operations in pork packing began in Cincinnati. During the two decades preceding the Civil War the city rose into prominence and was known as "Porkopolis." Here, as in Buffalo and the East, operations in packing were practically confined to the winter months. All of the pork was cured or "salted down," for the marketing of fresh meat was out of the question. Slaughtering methods were crude. Everything was done by hand.

A Romance of Industry

The development of the livestock industry in the West constitutes a thrilling chapter in American history.

An interesting writer on the Great West has stated: "The story of America's cattle trade is one of the most romantic tales of modern times. In its swing and its dignity, it truly is a saga. This story deals with more than mere meat, hides, and tallow; for its cogent, salient chapters have as much to do with men and their achievement as with animals and their products. It is concerned as much with the cowboy as it is with beefsteak. It begins by reciting the doings of a Spanish knight in armor. It continues with accounts of Indian conflicts, of range wars, of bravery and of cowardice, of heroic generosity, of sordid thievery, of gentleness, murder, and sudden death, of the thousand and one things that happened upon America's frontier and in the lonely wastes beyond. It tells of men who, raising livestock, not only provided foodstuffs for a nation but also shaped materially that nation's social and political thought."

As the East turned more and more to manufacturing and commerce, with great cities and thickly populated industrial

states, meat production on a larger scale became necessary to supply the consumers. For the first time there grew up in the West large ranches under one management for meat production. The undeveloped lands furnished ideal conditions for the new development.

With farsighted vision, the pioneers in the packing industry, anticipating this economic outcome, established their business nearer the source of raw materials. Buffalo and Cincinnati, and later, Chicago and other mid-western cities, became the leading packing centers.

After railways were built, cattle were carried long distances in cars, though the expense of the journey was relatively great and the loss from injury and death was large. Hogs could not be killed on a commercial scale except during the winter months, because there was no way of distributing the product quickly or of properly preserving it in summer time.

It is the claim of the meat packing industry that slaughtering under the factory system forms one of the most efficient and economical steps in meat purveying from farm to table. Soon after they are purchased in the stock yards, the animals pass one by one along a narrow alley in the packing house and are promptly slaughtered by gangs of men so arranged that, as soon as one animal is disposed of, another at once takes its place. There are differences in practice but the underlying principle of the modern method is, as a rule, that the product is conveyed to the worker for one specialized piece of workmanship and is then conveyed to the next. Each man has his particular task which he performs as the chain moves steadily forward. This specialization in operations leads to great skill on the part of the workmen. Output under such a system is both standardized and economical. At every step, it is hardly necessary nowadays to add, the most scrupulous cleanliness is observed. Indeed, meat had never been so hygienically prepared, handled, and distributed before the coming of the modern packing house.

Preparing Meat for the Table

The fresh meat is placed for several hours in what is called the "cooler" and in the case of dressed hogs is cut up into the parts familiar to all at retail shops. Beef is usually served on the family table within a fortnight of the time the steer leaves the farm. But some other meats require long processing, or curing, before they are ready. Bacon and hams are examples. Pork sides are cut according to need and local customs, but in the main it may be said they follow a division comprising hams, shoulders, bacon, and loins. For some trades, such as export to Great Britain, a small part of the pork supply is handled in whole "sides."

Curing is of two kinds. In the sweet pickle cure, the cuts are immersed in vats of sweet pickle, which is a liquid mixture of salt and sweetening, and are left to absorb the pickle until the requisite cure is attained. In the dry cure the cuts are packed in layers in water-tight containers with sugar, salt, and other curing agents sprinkled between the layers. In the dry salt cure, the pork cuts are laid one upon the other in tiers, with salt sprinkled on and between them. When the sweet pickled and dry-cured meats are sufficiently impregnated, they are smoked over a wood fire.

Another form of meat preservation is corning. It is most often employed for beef. In essence, it is a brine pickle. Years ago both corned beef and salt pork used to be "put down" at the beginning of the winter in almost every American farmhouse, but the practice is being replaced by the more modern system of purchase from the retail meat store.

Still more important commercially is the preservation of meat by cold temperatures or refrigeration. By means of natural or manufactured ice placed in refrigerator car cooling chambers it is now possible to transport fresh meat to almost any part of the land. Indeed, meat has the excellent quality of keeping in good condition at temperatures just above the freezing point. All storage space at the packing houses is cooled by mechanical refrigeration. Refrigerated railway car and ship cargo space is essential to successful transport of the perishable goods. These methods are used by all packers in forwarding their fresh meats to markets that sometimes are from five hundred to a thousand miles away from the packing plants. All but a small part of American meat for domestic trade is chilled; *i. e.* carried at low temperatures above freezing.

An Animal Is Not All Meat

Of course, the whole of any animal, however good, is not all meat. There naturally is shrinkage even under modern methods of preparation. The amount of meat varies from animal to animal or, in butcher term, its "dressing" varies. In general, however, the yield of meat ranges from 50 to 55 per cent of the live weight of all cattle marketed, from 45 to 50 per cent of all sheep, and from 70 to 75 per cent of all hogs marketed depending upon weight and finish. Prize and show animals ordinarily rank higher in this particular. The United States Department of Agriculture estimates that two-year-old prize and show steers at the International Livestock Exposition yield 66 per cent; 85-pound wethers, 58 per cent; and high-class 300-pound hogs, 82 per cent.

Lard is one of the best known products from hogs. It is obtained by "rendering" or melting the fats of the hog.

There should be mentioned one of the most noteworthy, if not epoch-making developments of the packing industry—the by-products, so-called. In general, they may be defined as anything from a hog, steer, or sheep not considered as meat proper.

Coincidental with the building of central packing plants arose the necessity of disposing of large amounts of waste materials or offal, making up about a quarter of the live weight of a meat animal. In the old butchering days these were thrown away and wasted because their value was not understood and because no means existed to turn them to account. Today they are taken by specialized trades which have sprung up and which owe their origin wholly to the fact that the raw material for their use has been made available by recovery from packing-plant operations. A few uses only of recovered materials need be mentioned: glue, soap, oleo oil (which gives its name to oleomargarine), stearin, casings (for sausage), gut for musical instruments and tennis racquets (from sheep intestines). Leather from the hides has a record going back to high antiquity. Others fairly well known are the horns and hoofs, which, after subjection to the action of steam, are laminated, or split, to make combs, brush handles, and similar things. Bones are used for knife handles, knick-knacks, dice, etc. Blood is utilized in some cases to furnish albumen, but chiefly, with the odds and ends of meat, fat, and residue, which cannot otherwise be turned to account, the blood in a packing house is made into fertilizer.

Humanitarian Contributions

Yet, it is perhaps in the field of the pharmacist that the rather prosaic by-product finds its most surprising applications. Pepsin is one of the most widely used bases of remedies for dyspepsia; surgeons now use ligatures made of sheep intestines for sewing wounds. In some surgical operations a substance which comes from the adrenal gland near the kidneys is employed to prevent hemorrhage, and kephalin also is used because it clots blood and acts as an astringent. A third substance, lecithin, is used to counteract snake poison and the venomous sting of insects. Other materials used in medicine and surgery obtained from the brain of cattle are the pituitary and pineal substances. Pancreatin is a digestive ferment; insulin, a discovery for the relief of diabetes, is obtained by a distillation process from the pancreas; from the thyroid glands of sheep, preparations are made that are prescribed in case of premature bone-hardening. In fact, several other medicinal preparations are made today from what were formerly wasted portions of meat animals. In all, it has been estimated that about 140 articles are now obtained from meat animals which may be classed as "by-products."

The Economies of By-products

One could scarcely conceive the packing industry without its by-products. Because of the inclusion of by-products in the value of the meat animal when bought, the packer can, and does, pay a higher price for it to the farmer-producer. On the other hand, because by-products have a value when sold that goes to meet the first cost, the packer can sell, and does sell the total meat at a lower return than would be necessary were there no by-products to make up the difference. Thus, producer and consumer of meat benefit, and the manufacturer of the by-products has something valuable to process further and to turn to human use. The farmer gets relatively more and the household buyer of meat pays relatively less money than would be obligatory if the numerous by-products were still not utilized as in the old days.

Swift & Company
Agricultural Research

Printed in U.S.A. 33761

Swift & Company
Chicago

Agricultural Research Bulletin No. 3
September, 1935

CUTS OF MEAT

DURING the last ten years there has been an increased interest in meats. Undoubtedly, this has been due to the activities of individual meat packers and the Institute of American Meat Packers, and also of the National Live Stock & Meat Board of Chicago.

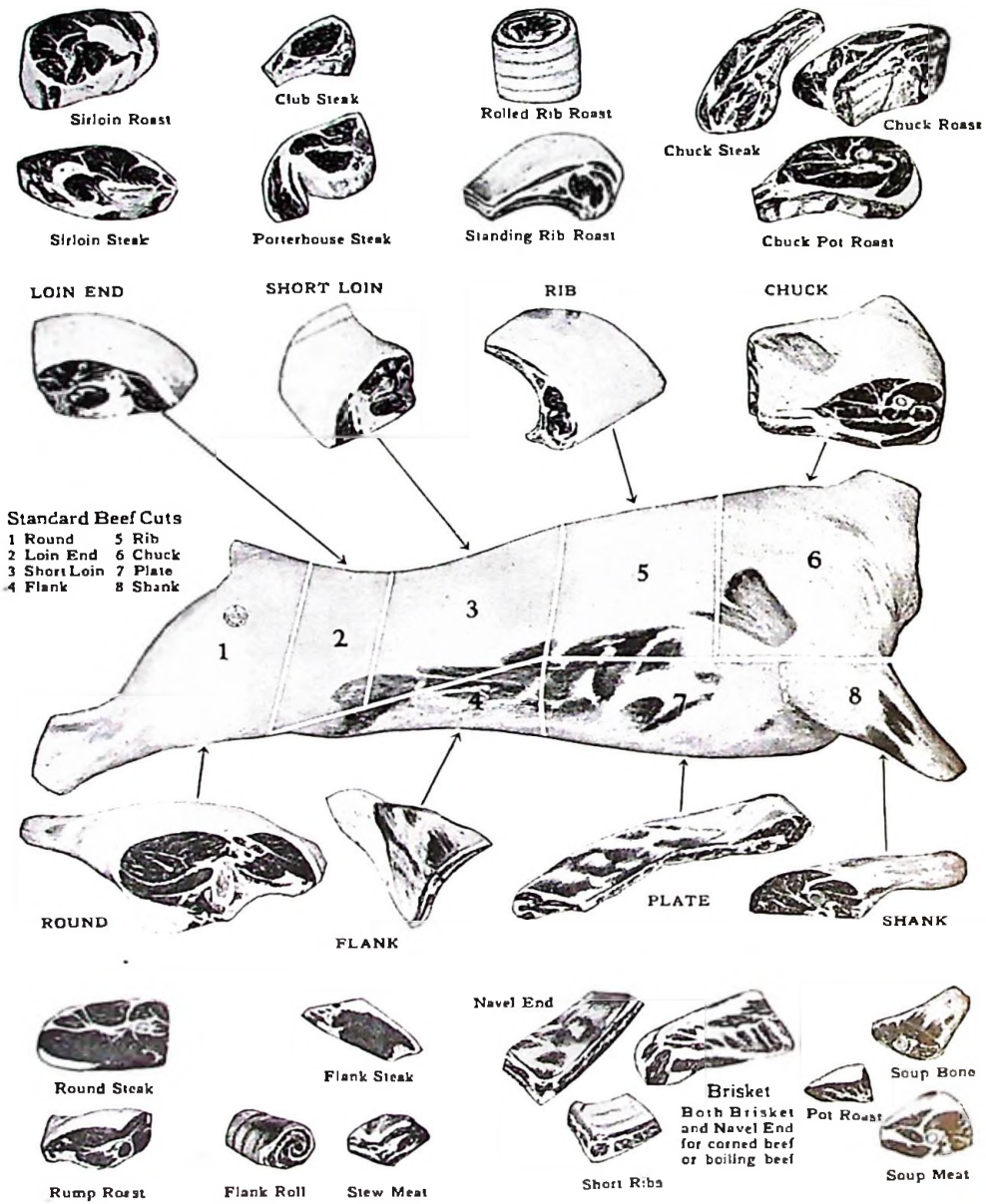
The efforts of the above named concerns and organizations have been pointed toward familiarizing producers and consumers with the various cuts of meats, factors of quality, nutrition, etc. A collateral result of the effort of all of these has been to stimulate an interest in meats among farm boys and girls.

Swift & Company annually receives thousands of requests for material that will help persons to identify the different cuts of meats. In the interest of the better handling of these requests, we are showing in this pamphlet the standard (Chicago style) wholesale and retail cuts of beef, pork, and lamb.

Additional similar information will be found in Agricultural Research Bulletin No. 4.

BEEF CARCASS AND BEEF CUTS

Beef is probably the most generally used of all meats. The many cuts pictured here afford a great variety of meat dishes.



HOG CARCASS AND PORK CUTS

Pork is among the most generally used of all meats.

There are many cuts besides the familiar ham, bacon, and pork chops. Some of these are adaptable to similar uses such as roasts or steaks.

Ham; so mildly cured that is not necessary to parboil

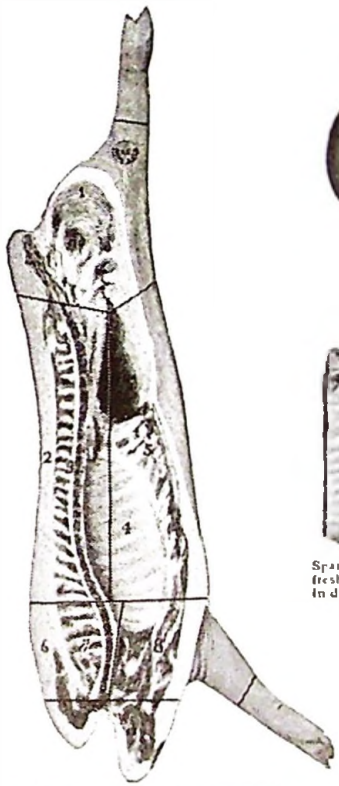
Standard Pork Cuts
(Chicago Style)

1 Ham — 5 Bacon
2 Fat Back — 6 Clear Plate
3 Loin — 7 Shoulder Butt
4 Spare Ribs — 8 Picnic Shoulder
7, 8 Skinned Shoulder

Bacon; dry cured with salt and sugar, and smoked, giving it a sweet delicate flavor

Fresh Ham; desirable for steaks and roasts

Ham cured and smoked



Fat Back; used for salt pork and paprika bacon

Loin; usually sold as pork chops or pork roasts

Spare Ribs; sold fresh, pickled or in dry salt

Bacon; trimmed to shape, cured and smoked

Skinned Shoulder; may be sliced into pork steaks or used as roasts

Picnic Shoulder; cured and smoked

Clear Plate; used for salt pork

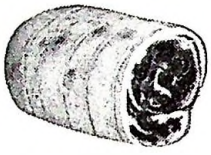
Shoulder Butt; used for steaks and roasts

For recipes, write to
Martha Logan Test Kitchen
Swift & Company
Chicago, Ill.

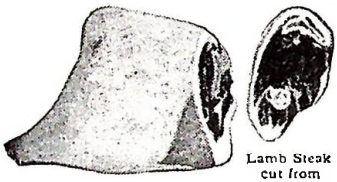
LAMB CARCASS AND LAMB CUTS

By following this chart, one may easily select the cuts of lamb best suited for variety.

Lamb chop and leg of lamb are, of course, well known; but the shoulder makes a desirable roast, or it may be cut into large meaty chops.

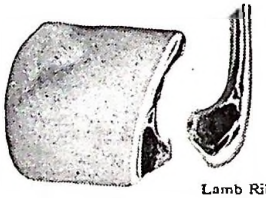


Boneless Lamb Roll; Consists of Shoulder, Breast and Shank



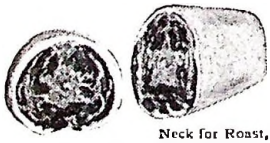
Lamb Leg for Roasts and Steaks

Lamb Steak cut from Leg



Lamb Ribs for Roasts

Lamb Rib Chop

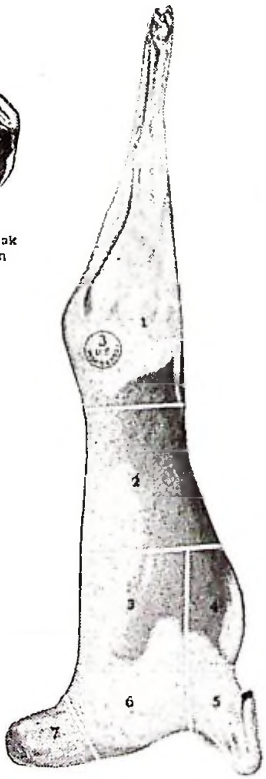


Neck Slice for Braising

Neck for Roast, Broth or Stew

Standard Lamb Cuts
(Chicago Style)

1 Leg
2 Loin
3 Ribs
4 Breast
5 Shank
6 Shoulder
7 Neck



Chops from the shoulder are large and meaty

Lamb Loin for Roasts

Lamb Loin Chop

Breast for Roasts or Stews

Shank for Roast, Stew or Broth

Shoulder for Chops or Roasts

Should the Fell Be Removed?
The fell is a thin paper-like covering over the lamb. It does not affect the flavor of the meat and need not be removed before the lamb is cooked.

Additional copies of this bulletin are available upon request.

Printed in U.S.A. 39705

Swift & Company
Chicago

Agricultural Research Bulletin
No. 4
October, 1935

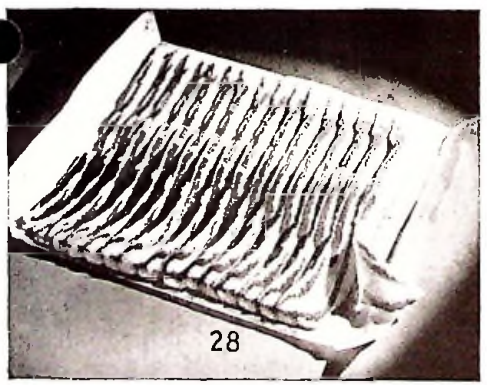
CUTS OF MEAT

DURING the summer of 1935 Swift & Company conducted a meats identification contest for Four H Club boys and girls. Contestants were furnished pictures of more than seventy cuts of beef, lamb, pork, and special items known in the meat trade as "fancy meats."

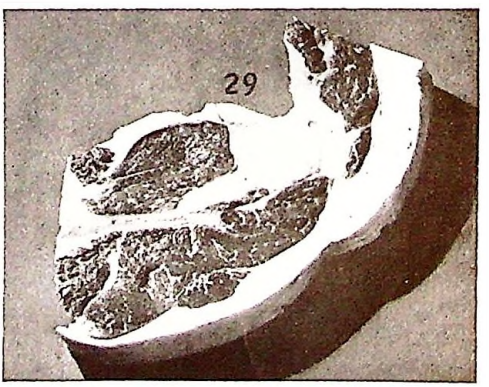
This contest proved so popular and the pictorial material used has been sought by so many people that it was decided to reproduce pictures of the cuts in an Agricultural Research Bulletin. Accordingly, herein we picture the cuts and list the names by which they are known.

It is believed that this manner of presenting information regarding various meat cuts will prove of educational value, not only to members of Four H Clubs and high school students of agriculture, but also to the staffs and students of agricultural colleges and livestock producers.

Agricultural Research Bulletin No. 3 also describes cuts of meat.

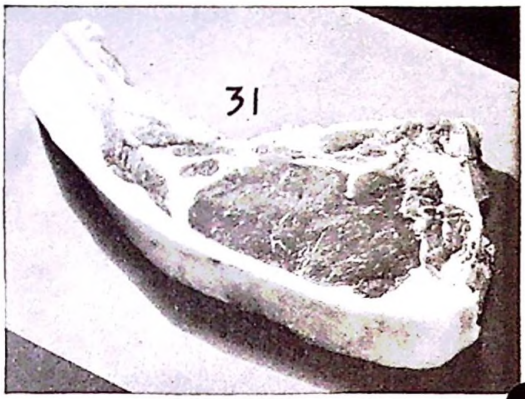


Sliced Bacon (Pork)

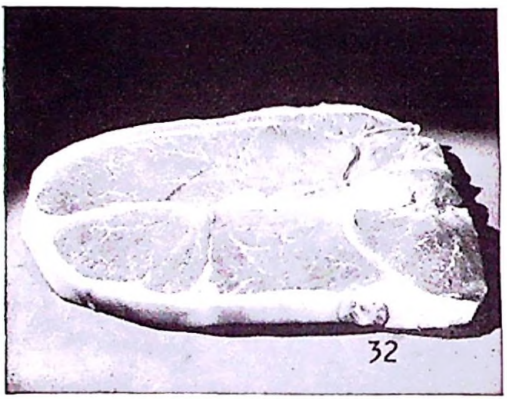


Porterhouse Steak (Beef)

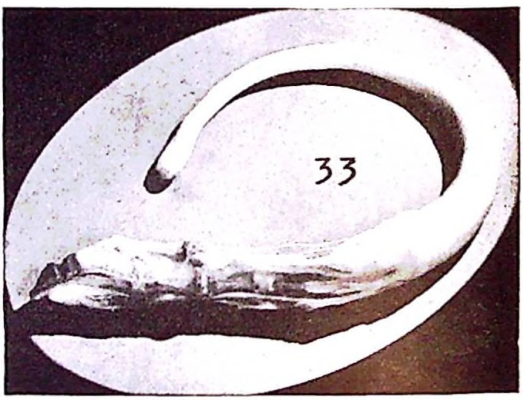
Rump Roast (Beef)



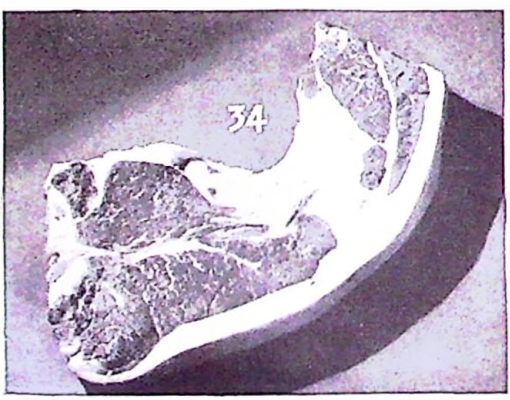
Club Steak (Beef)



Round Steak (Beef)

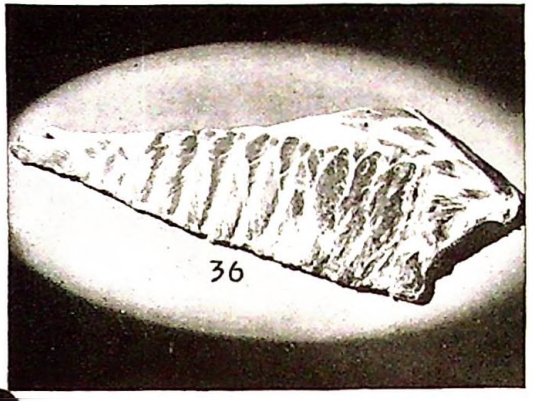


Pork Tail

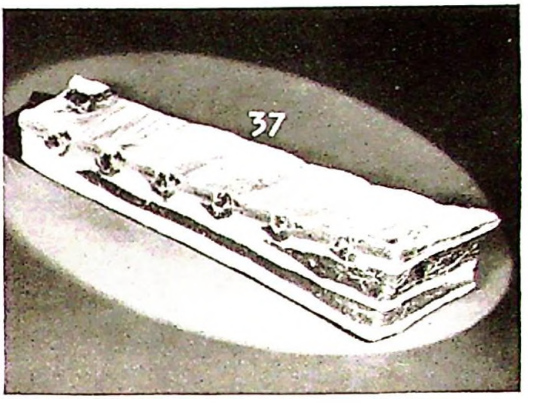


T-Bone Steak (Beef)

Lamb Neck Slices



Pork Spareribs

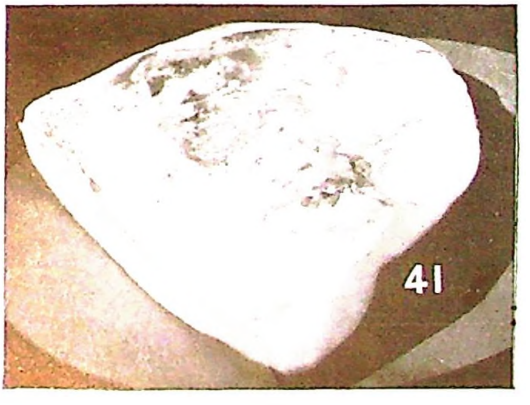


Beef Short Ribs

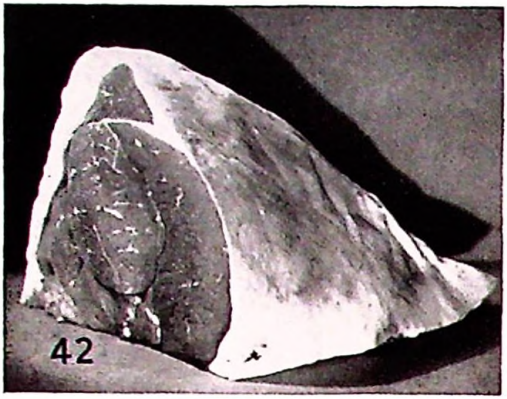
Sirloin Steak (Beef)

Chuck Rib Roast (Beef)

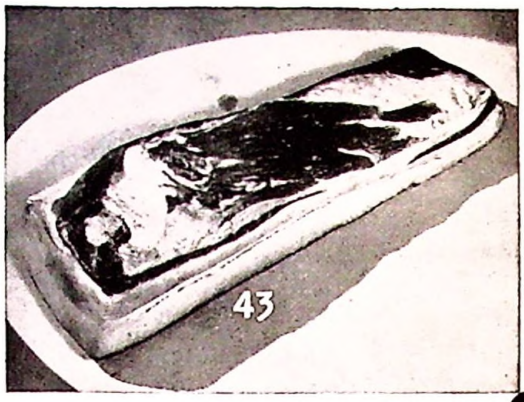
Smoked Picnic (Pork)



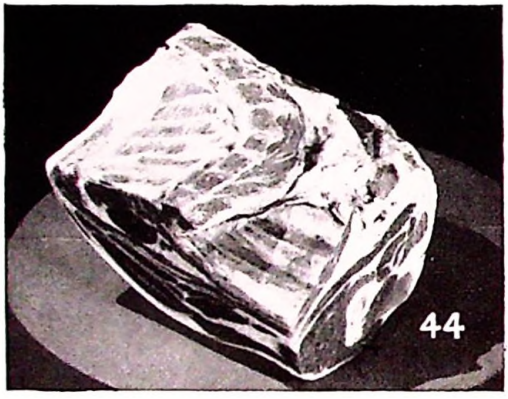
Pork Jowl



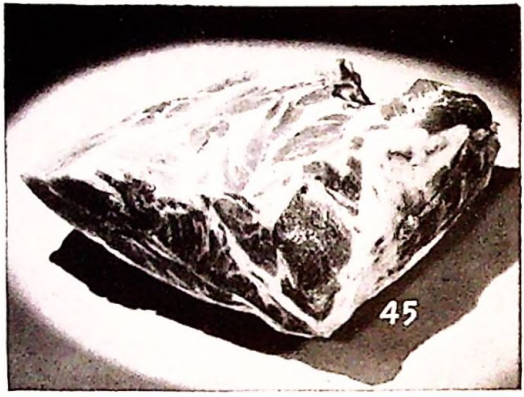
Beef Knuckle



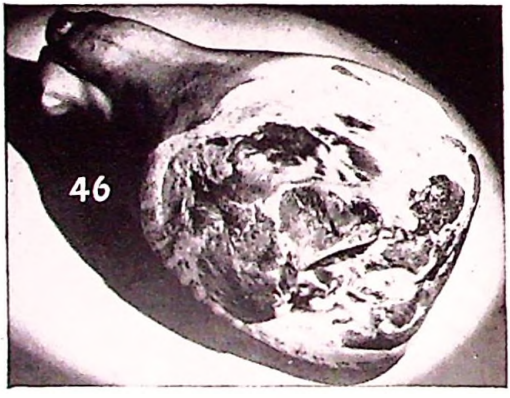
Smoked Pork Brisket



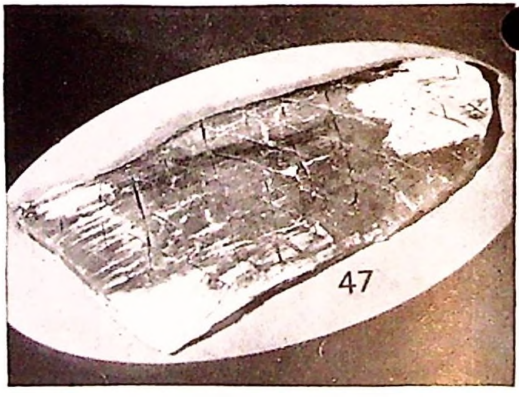
Lamb Shoulder Roast



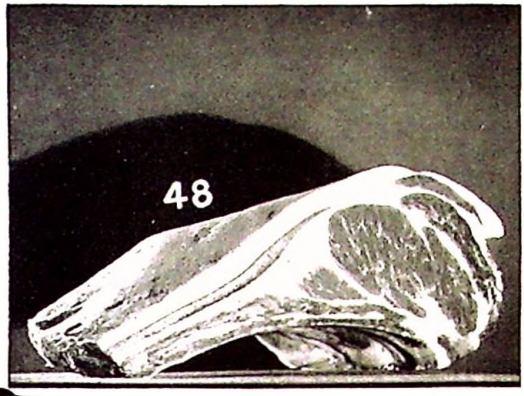
Boston Butt (Pork)



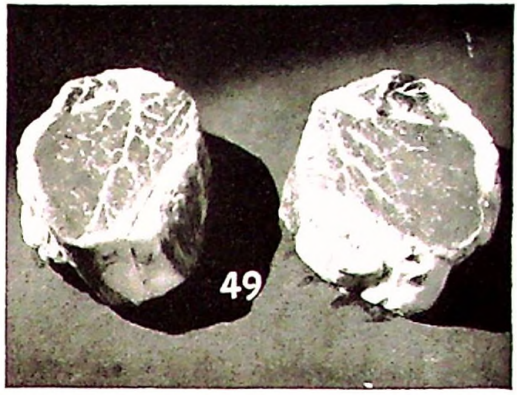
Smoked Ham (Pork)



Flank Steak (Beef)

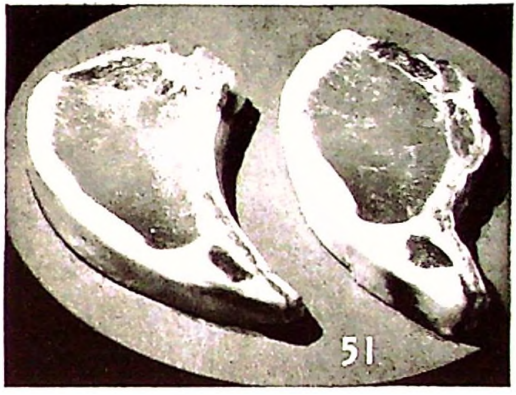


Standing Rib Roast (Beef)

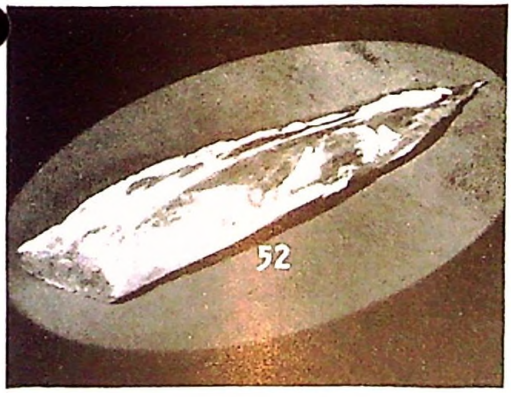


Beef Tenderloin Steaks

Ox Tail

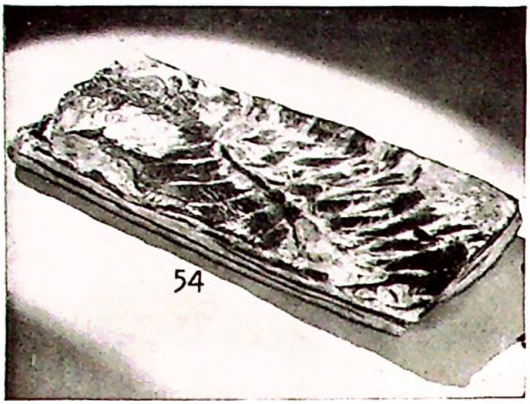


Pork Chops

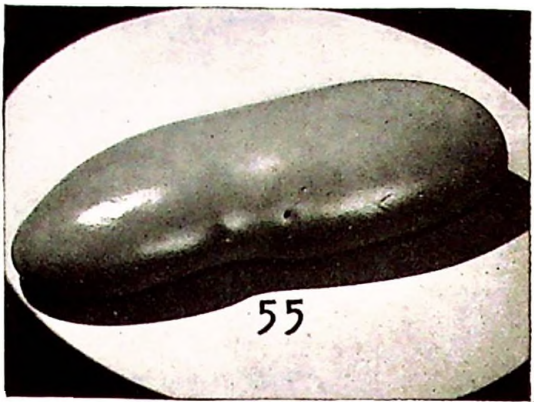


Pork Tenderloin

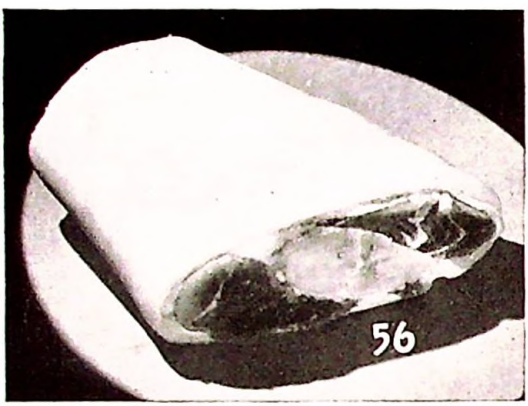
Fresh Skinned Shoulder (Pork)



Smoked Bacon (Pork)

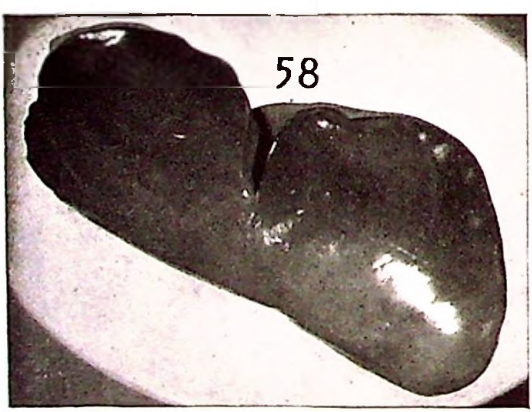


Pork Kidney

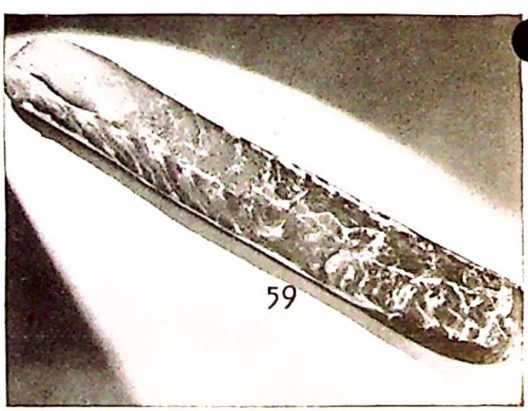


Pork Hock

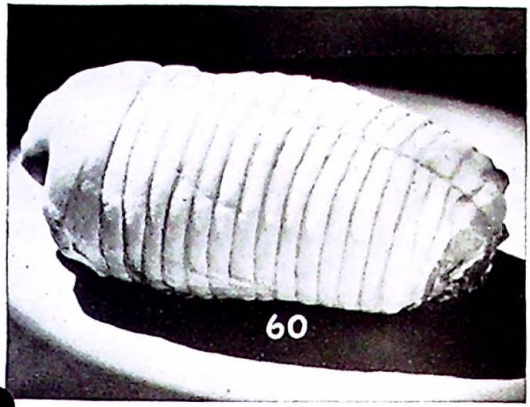
Smoked Jowl Square (Pork)



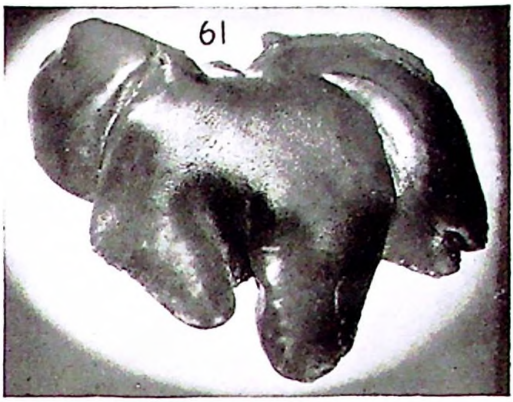
Lamb Liver



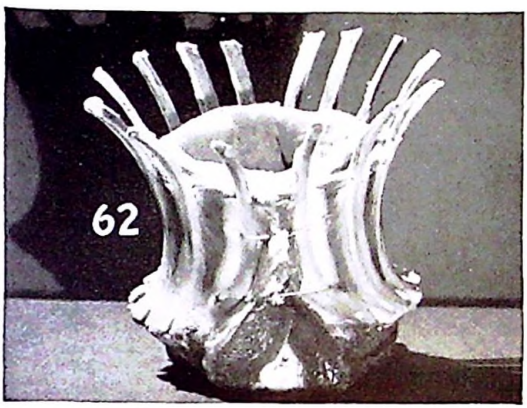
Canadian Style Bacon (Pork)



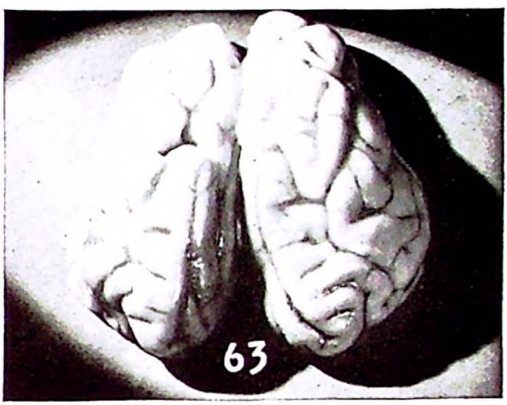
Fresh Ham Roll (Pork)



Pork Liver

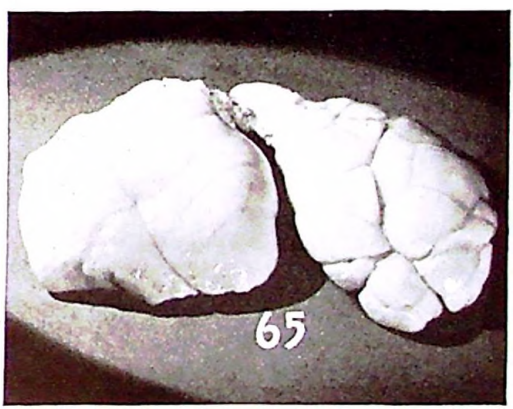


Crown Roast of Lamb

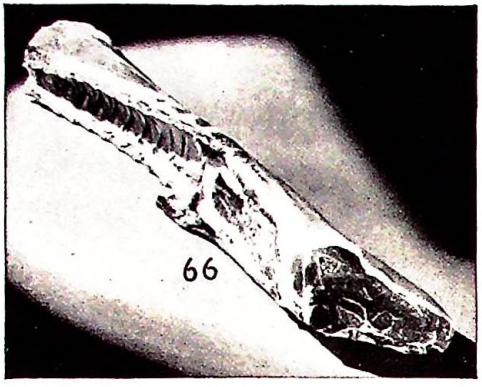


Pork Brains

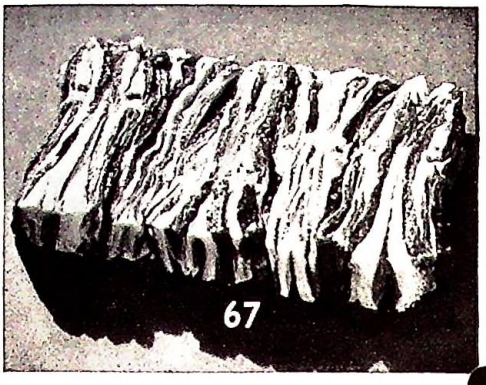
Lamb Leg Roast



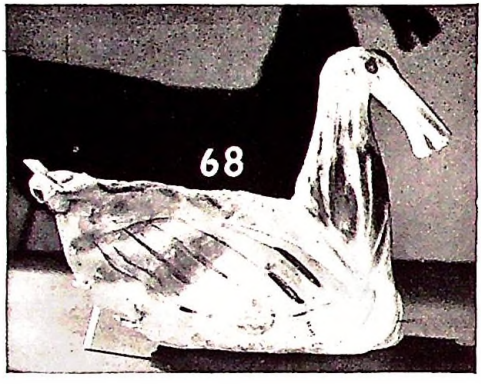
Calf Sweetbreads



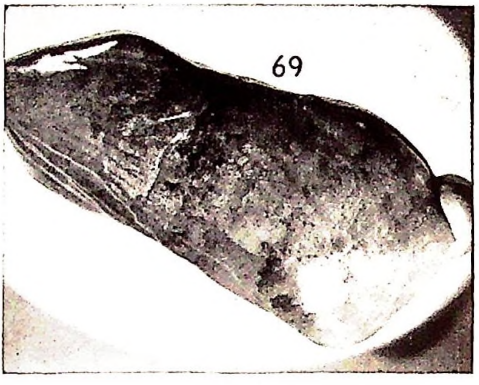
Fresh Pork Loin



Breast of Lamb

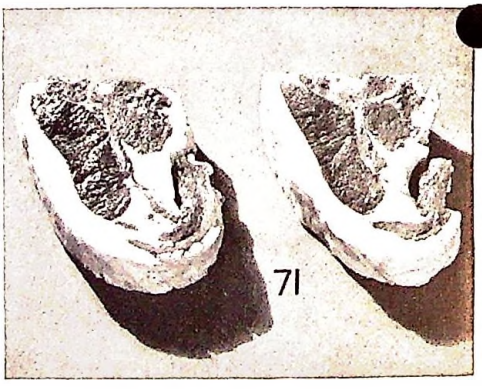


Mock Duck (Lamb)



Beef Liver

Calf Liver



Lamb Loin Chops

Additional copies of this bulletin are available upon request.

Printed in U.S.A.

Swift & Company
Chicago

Agricultural Research Bulletin No. 5 January, 1936

ABOUT WOOL

(Quoted from Bulletin Published by Associated Wool Industries)
(Can be read in six minutes.)

"THROUGH the ages Wool has been one of man's closest friends. No other textile fibre has afforded him greater protection, comfort, and luxury.

"No one knows just when man first learned to spin and weave Wool into fabrics. Fabrics of Wool have been unearthed in the ruins of villages inhabited by the Swiss Lake dwellers ten thousand years ago. Wool garments, woven with the highest skill, were worn by the Babylonians as early as 4000 B. C., and excavations in Mesopotamia have brought to light tiny figures of sheep made of bone or gold buried with other royal treasures between 3500 and 3000 B. C.

"It is certain that sheep have been valuable to man for many thousands of years. Wool was important in the very earliest civilizations. Wool and sheep are referred to many times in the Bible. The Book of Genesis tells us that 'Abel was a Keeper of Sheep . . .' Today Wool still retains its position as a most versatile and useful textile fibre. No satisfactory substitute for Wool has ever been discovered or created in the scientific laboratory.

"The qualities and characteristics of Wool that make it so desirable are inherent in the fibre itself and are due to its marvelous structure. Wool fibres are hollow, and examined under a microscope look something like pine cones. Each fibre is covered with tiny interlocking scales or serrations. The fibre structure explains why Wool is one of nature's greatest insulators, maintaining an even body temperature under changing outside temperatures. Thus we find that Wool keeps the warmth of the body in and the winter cold out, and that it also protects the body against excessive heat, as the Arabs, who wear Wool burnooses over their heads under

hot desert suns, have discovered. Wool is an efficient natural thermostat. It thus provides maximum protection against extremes of temperature as well as against sudden changes of temperature. That is why Wool is regarded as an important asset to health, a safeguard against colds.

"Not only is Wool healthful to wear but it is a very durable fibre and, therefore, most desirable for wearing apparel designed for strenuous activity. Wool is *alive*, highly elastic, and exceedingly strong. Its life and elasticity are reasons why Wool clothing resists wrinkling and returns to proper shape when rested after hard usage. Wool is fine, soft and light, and can be woven or knitted into fabrics of gossamer sheerness and exquisite texture. Fabrics made of Wool have a soft, natural lustre, inherent in the fibre itself, and they can be dyed in supremely lovely colors, unequalled for richness and depth.

"In addition to clothing, Wool is being used today for practically every type of wearing apparel and accessories; Wool is used for blankets, draperies, and carpets, and in the form of felt for a thousand and one purposes besides slippers. It is used in pianos to soften the tone, in automobiles and airplanes to prevent vibrations, and with machinery of all kinds to absorb shock or deaden noise. Wool, above all fibres known and used by man, through all time, has proved its worth, and with the passing of the centuries, its importance as a textile fibre constantly deepens and widens.

"The first sheep that came to the United States landed in Jamestown in 1609. The colonial governments did everything possible to encourage the woolen industry, even forbidding by law in 1654 the importation of Wool from England. The first fulling mill was established near Boston in 1643 and Wool manufacturing rapidly became an important 'New England' industry. President Washington imported the best breeds of sheep, and arranged to bring to this country the most experienced spinners and weavers from abroad. When the pioneers pressed westward with the opening of the Erie Canal in 1825, great areas marvelously suited to sheep raising were opened up, and mass production methods were introduced into American Wool growing.

"Today in the United States there are upwards of 50,000,000 head of sheep and according to the last census some 472,000 sheep raisers. The normal consumption of Wool in the United States is about 600,000,000 pounds. If this were all used for wearing apparel, it would make at least four suits for every man in the United States.

"During the years when America was rapidly forging ahead as a Wool-producing country, New England maintained leadership as a Wool manufacturing center, in which today the largest Wool mill in the world is operated.

"In the manufacturing of Wool there are three distinct methods: Woolen, Worsted, and Felt. In making Woolens, the fibres are carded together but there is no attempt to keep them parallel. The result is a fuzzy wooly fabric such as a blanket or a rough overcoating.

"In the second method, namely Worsteds, the purpose is to get a fine smooth fabric and, to do this, the Wool is combed, the short fibres are removed, the long fibres are all laid straight and parallel in the form of a rope. This rope, called a top, is then drawn out into smaller and smaller diameter and finally spun into yarns. This yarn is so carefully drawn out that a pound of our finest Wool can be spun out to a length of 16 miles. From such yarn are made the finest serges and dress goods.

"The third method of manufacturing Wool is the making of Felts. There is an old story that the word 'felt' originated with a French monk, named St. La Feutre, who in the middle ages was on a long pilgrimage. His feet becoming sore, he stopped at the roadside, clipped several pieces of Wool from a sheep and put them in his sandals. When he reached the end of the pilgrimage the pieces of Wool had become welded into one solid mass. There existed the three elements that are used to this day to make felts; heat, moisture, and pressure. As the Wool is pounded while hot and moist, the serrations firmly interlock and the result is a solid mass of pressed felt.

"Many people have the mistaken idea that Wool fabrics are all heavy in weight, fuzzy, or hot. In the last few years, great strides have been made in turning out fine, soft, sheer, lightweight woolens and worsteds, as light

as four to six ounces to the yard and suitable for the lightest of evening gowns or for cool tropical Worsted suitings.

"Modern living conditions, increased interest in sports and travel, and demand for formal fabrics which drape beautifully, resist wrinkling, and are easy to care for are reasons why Wool is today a fashion leader. When you think of Wool think of Style, Comfort, Health. Also, don't forget that Wool is economical, too—it provides long wear as well as lasting luxury Wear WOOL—all day, every day; Wool will be your closest friend."

The Seven Wonders of Wool

1. Natural animal body covering.
2. Thermostatic—protects from heat and cold.
3. Porous and absorbent.
4. Strong and durable.
5. Light and soft.
6. Fire-resistant.
7. Elastic.

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386 Fourth Avenue, New York

. . A cooperative organization representing Wool growers, Wool dealers, and Wool manufacturers, formed to tell the story of Wool to the American public and to make known interesting new developments in fabrics and merchandise made of Wool, so that consumers may use this information to advantage from both fashion and utility points of view.

ADDITIONAL COPIES OF THIS BULLETIN ARE AVAILABLE UPON REQUEST

Printed in U.S.A. 34[illegible]

Swift & Company
Chicago

Agricultural Research Bulletin
No. 6
February, 1936

CATTLE BY-PRODUCTS

(Can Be Read in 6 Minutes.)

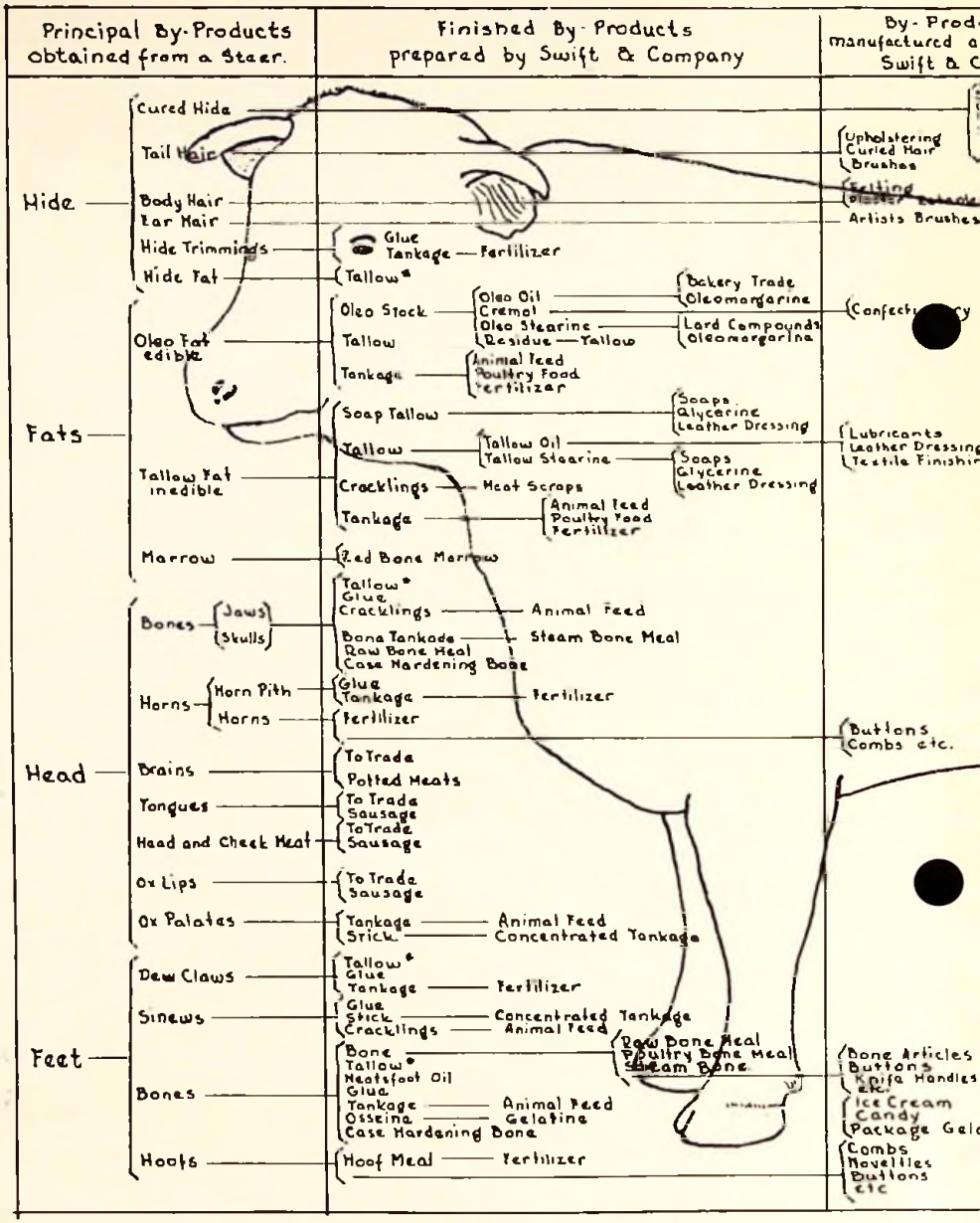
WHAT per cent of a beef animal is meat? What per cent of cattle by-products is useful? How much of a bovine animal is waste? What finished products are made from cattle by-products? Just how important are these finished products in our present-day life?

These are a few of the many questions that are discussed by livestock producers, and classes in agriculture, economics, and commercial geography.

Before attempting to answer the foregoing questions and others which may be in the minds of the readers of this bulletin a brief explanation is needed. From cattle the meat packers obtain two different kinds or groups of products. They may be classified as (1) Meat, (2) By-products. Contrary to the impression that may be obtained from these two group names which are used by the meat packing industry, there are some by-products that are edible and therefore might be classified as "meat."

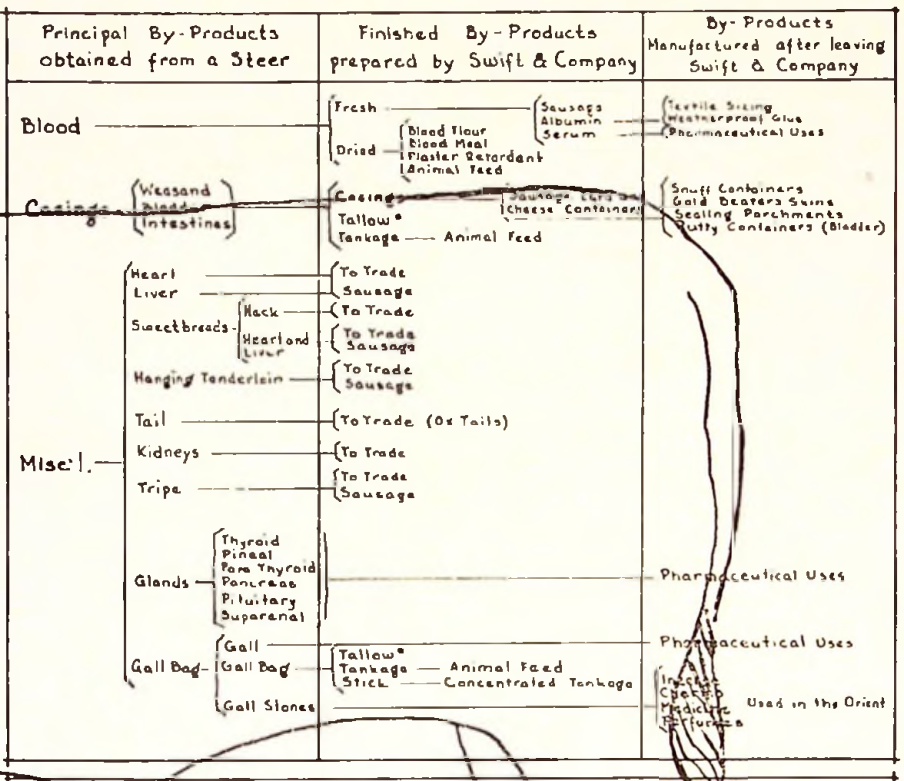
A complete list of all the by-products from cattle, calves, hogs, and sheep would require several pages. We are presenting in this bulletin a chart which gives a list of the principal by-products of a steer. It is suggested that the chart be examined carefully. Note those products which Swift & Company finishes for the ultimate users and those which are sold to other concerns for final manufacturing.

CATTLE BY



* Processed same as Tallow Fat (Inedible)

PRODUCTS



SUMMARY

	Percentage of Green Product to Live Steer	Percentage of Finished Product to Live Steer
BEEF	55.6	54.3
BY-PRODUCTS		
HIDE	7.2	5.9
FATS	3.4	2.2
HEAD	3.4	2.2
FEET	1.5	1.1
BLOOD	3.8	.7
CASINGS	1.2	.8
MISCELLANEOUS	2.0	3.2
VALUELESS MATERIALS	10.1	10.1
SHRINKAGE	6.8	6.8
ADDITIONAL SHRINKAGE THROUGH PROCESSING		12.7
TOTAL STEER	100.0	100.0

SWIFT & COMPANY
COMMERCIAL RESEARCH DEPT.
CHICAGO No 1479

It will be noted on the chart that, on the average, only 54.3 per cent of a live steer is beef. In ordinary slaughtering operations this figure varies from 40 to 65 per cent, according to the weight and finish of the animal. Of the remaining 45.7 per cent of the live weight of the steer on the chart, 10.1 per cent has no value and 19.5 per cent is lost through shrinkage leaving only 16.1 per cent of the by-products, by weight, which are converted into finished products.

An average 1,000-pound steer would be divided as follows:

Beef	543 lbs.
By-products	161 lbs.
Shrinkage and Waste	296 lbs.

Without the aid of science the packer would never have been able to work out methods of utilizing the different by-products of cattle. These products benefit the human race in many ways. Many ailments are relieved by extracts from cattle glands. Less "aristocratically named" items are used for religious rites or perfumes according to the nature of the business of the manufacturer who buys them. Numerous ordinary articles, such as glue, buttons, combs, knife handles, soap, etc., originate with cattle. Finally, but not least, the utility value of by-products has increased the prices the cattleman receives for his animals and reduced the cost of beef to consumers. Under normal conditions the returns from the by-products of cattle are almost large enough to offset the operating and marketing expenses of the packers, including transportation costs from packing plants to retail shops.

In other words the meat packers, on the average, pay to cattle producers all that they get for the beef. From the by-products, they secure enough to pay all expenses of buying and slaughtering the cattle, transporting the beef from packing plants to retailers, refrigeration, sales expense, taxes, etc., including the average profit of less than one-half cent a pound.

Additional copies of this bulletin are available upon request.

Printed in U.S.A. 31126C

Swift & Company
Chicago

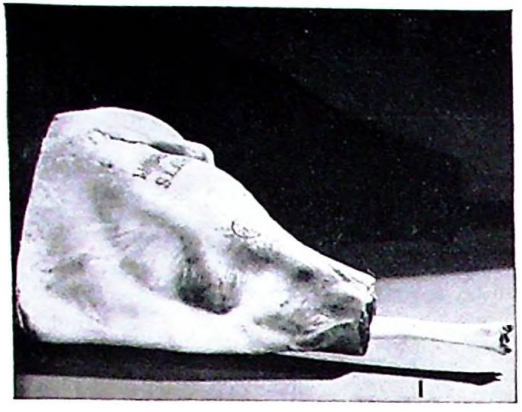
Agricultural Research Bulletin No. 7
October, 1936

CUTS OF MEAT

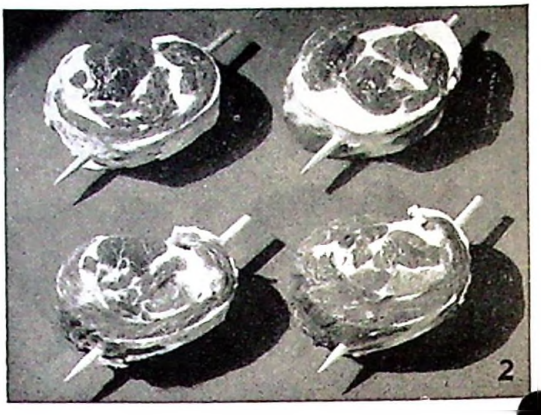
Reproduced herein are the different cuts of meat used in the 4-H Club Meat Identification Contest of 1936. The names given the cuts of meats are those generally used in the Chicago area. It is realized that other names may be used in some other sections of the United States.

On the first five pages are pictures of retail cuts. On the last two pages will be found outlines of carcasses of beef, pork, and lamb with lines drawn to indicate the usually recognized wholesale cuts. The keys adjacent to the outlines of the carcasses give the names of the cuts that are in general use in the Chicago area.

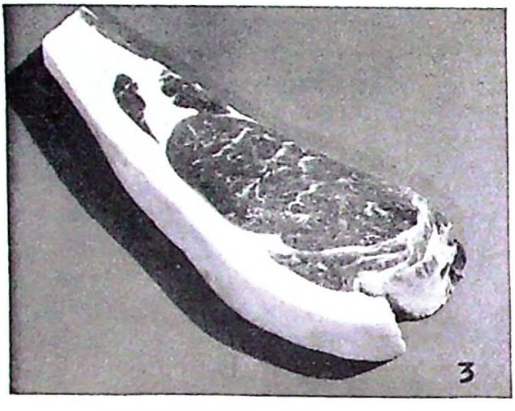
Pictures of the cuts of meat used in the 4-H Club Meat Identification Contest of 1935 are contained in Agricultural Research Bulletins Nos. 3 and 4. These will be furnished upon request.



French Leg of Lamb

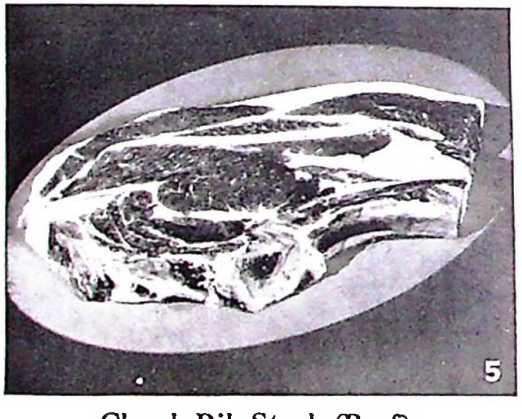


Saratoga Chops (Lamb)

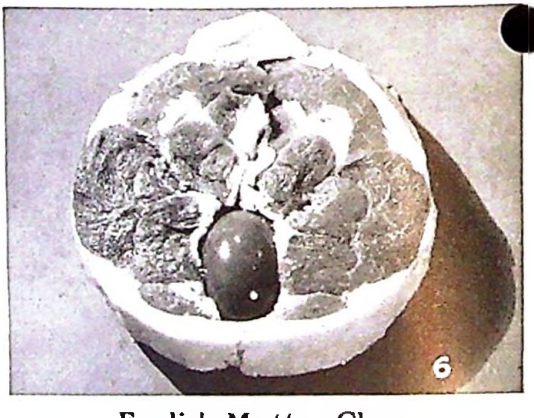


Boneless Rib Steak (Beef)

Square Cut Bacon from Plate (Pork)



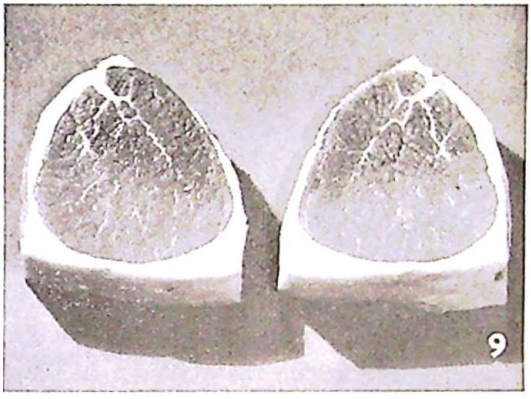
Chuck Rib Steak (Beef)



English Mutton Chop

Skinned, Rolled, Boned, and Tied Picnic (Pork)

Rolled Chuck of Lamb

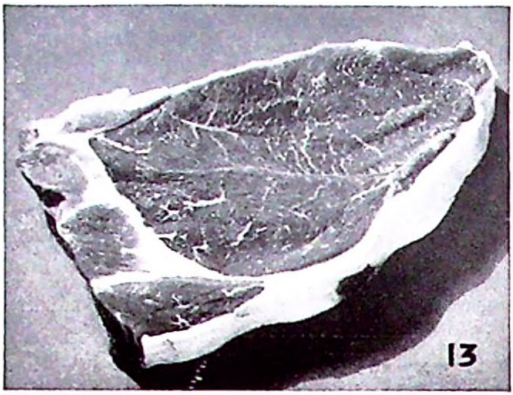


Swiss Steaks or Eye of the Round (Beef)

Rolled Rib Roast (Beef)

Rolled Breast of Lamb

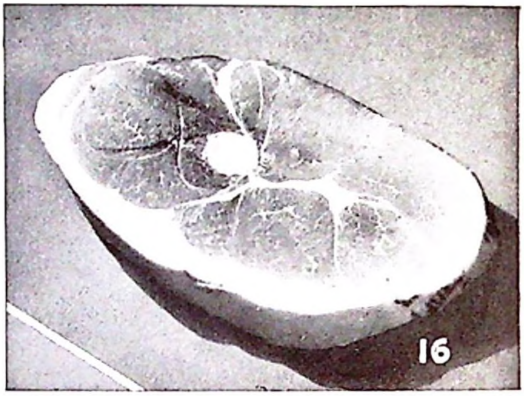
Pork Ear



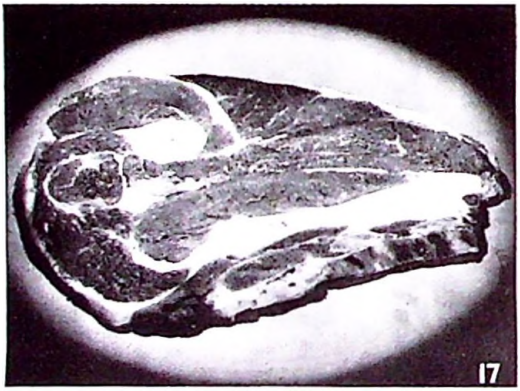
Clear-cut Shoulder Steak (Beef)

Pork Tongue

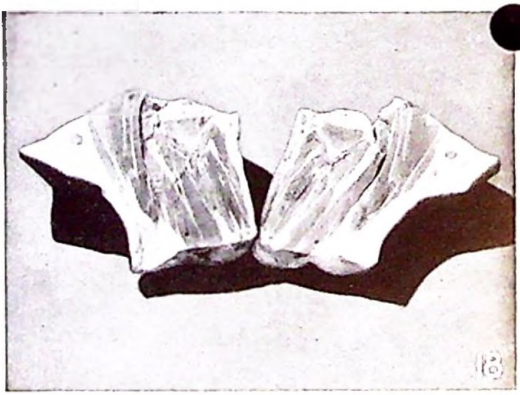
Shoulder Arm Roll (Beef)



Center Slice of Ham (Pork)



Chuck Arm Steak (Beef)

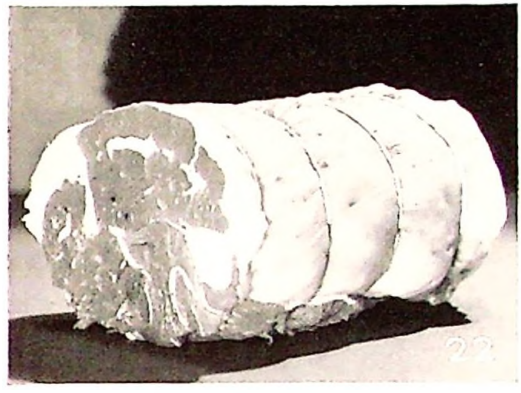


Split Shank (Pork)

Bottom Round Steak (Beef)

Rolled Plate of Beef

Boneless Brisket (Beef)

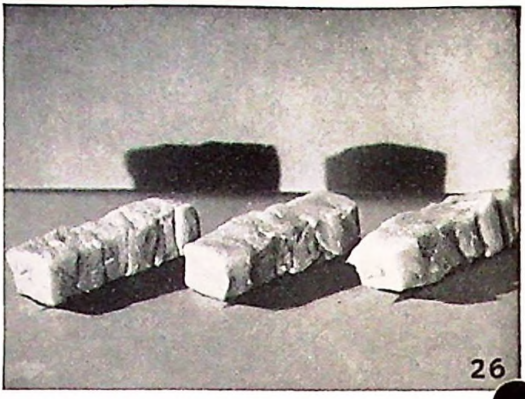


Neck Roll (Beef)

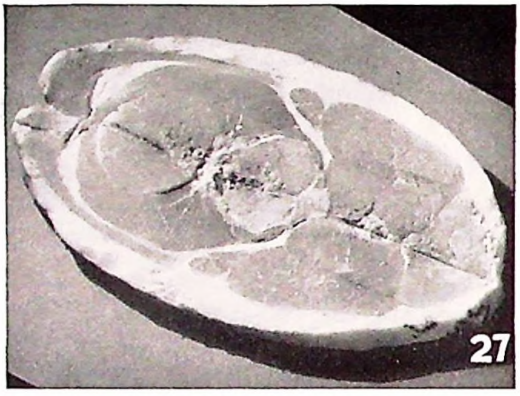
Beef Sweetbread

Chuck Arm Pot Roast (Beef)

Lamb Pluck



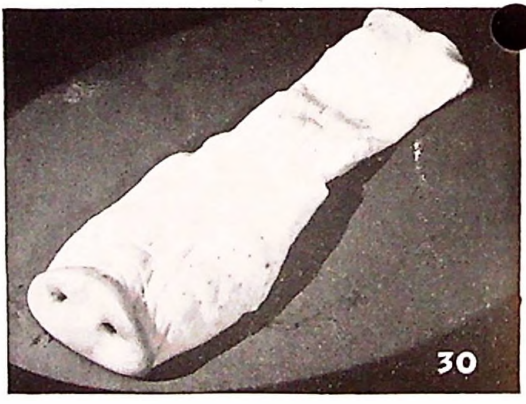
City Chicken or Mock Chicken Legs (Veal)



Butt Slices of Ham (Pork)

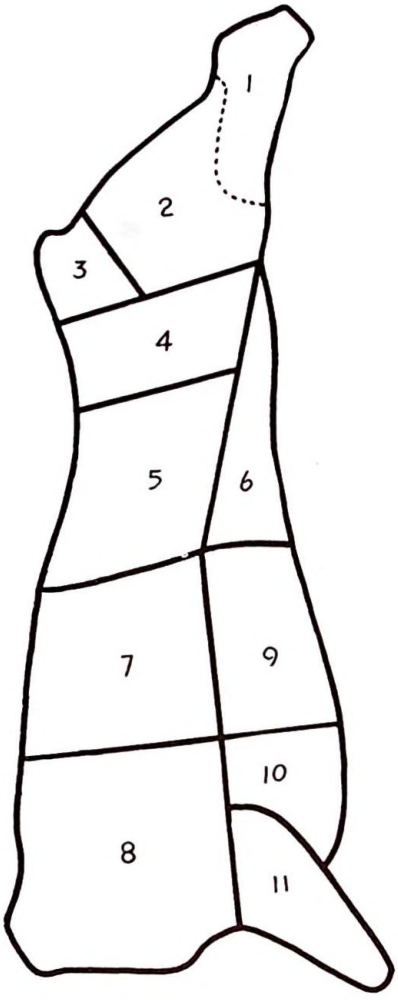
Short Cut Tenderloin (Beef)

Top Round Steak (Beef)



Pork Snout

WHOLESALE CUTS OF MEAT



BEEF:

1. Hind Shank
2. Round (Rump and Shank Off)
3. Rump
4. Loin End
5. Short Loin
6. Flank
7. Rib
8. Chuck
9. Navel End
10. Brisket
11. Fore Shank

1, 2, and 3—Round

4 and 5—Full Loin

1, 2, 3, 4, 5, and 6—Hind Quarter

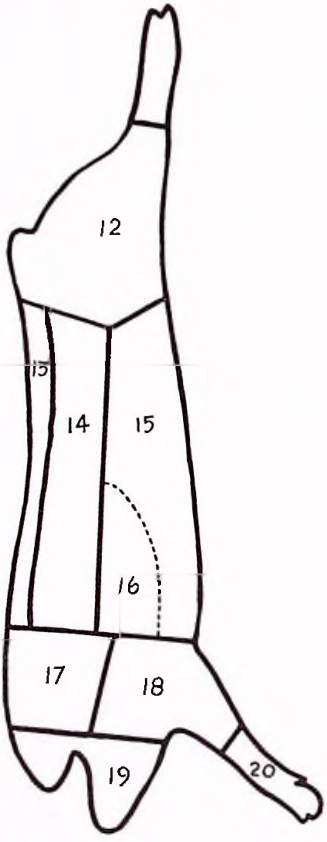
7, 8, 9, 10, and 11—Fore Quarter.

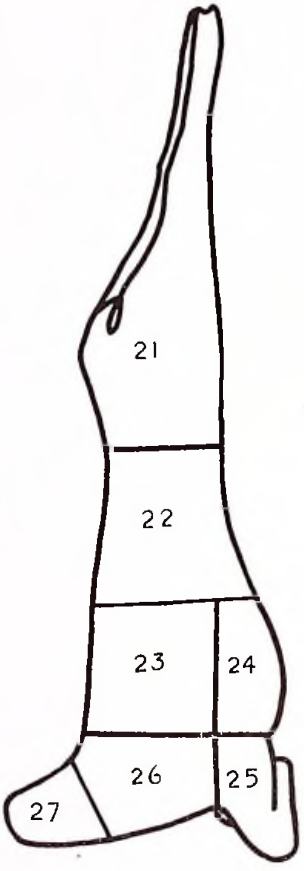
PORK:

12. Ham
13. Fat Back
14. Loin
15. Belly
16. Spareribs
17. Shoulder Butt
18. Picnic Shoulder
19. Jowl
20. Front Foot

LAMB:

21. Leg
22. Loin
23. Rib
24. Breast
25. Shank
26. Shoulder
27. Neck





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Agricultural Research Bulletin No. 8 November, 1936

FOOD VALUES in the Diet

(Can Be Read in 9 Minutes.)

In the selection of a normal diet, one should know the important sources of nutrients such as protein, calories, minerals, and vitamins as well as the functions of each. This information is given in graphic and concise form in this bulletin.

The charts contained herein show the relative value of many common foods as a source of one or more of the aforementioned food elements or compounds. The length of the black bars on the charts represents the relative amount of each nutrient contained in a serving of each of the selected foods.

A well-balanced normal diet necessary to maintain health must furnish the following:

Protein, for building and repairing tissues.

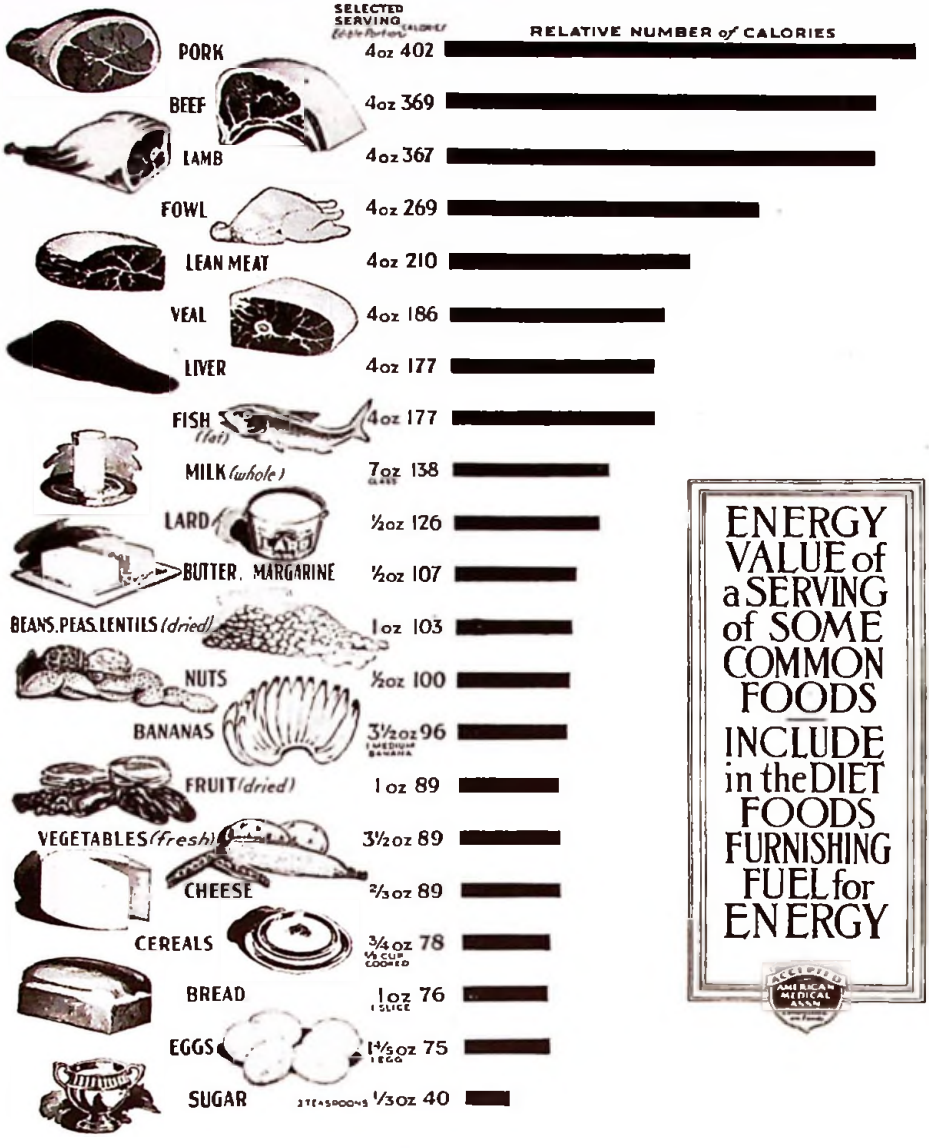
Calories, for the required heat and energy.

Mineral elements, for building the bones, teeth, blood, etc., and for regulating the body.

Vitamins, for promoting growth and protecting health.

Bulk, for aiding in the elimination of waste.

CALORIES



ENERGY VALUE of a SERVING of SOME COMMON FOODS

INCLUDE in the DIET FOODS FURNISHING FUEL for ENERGY

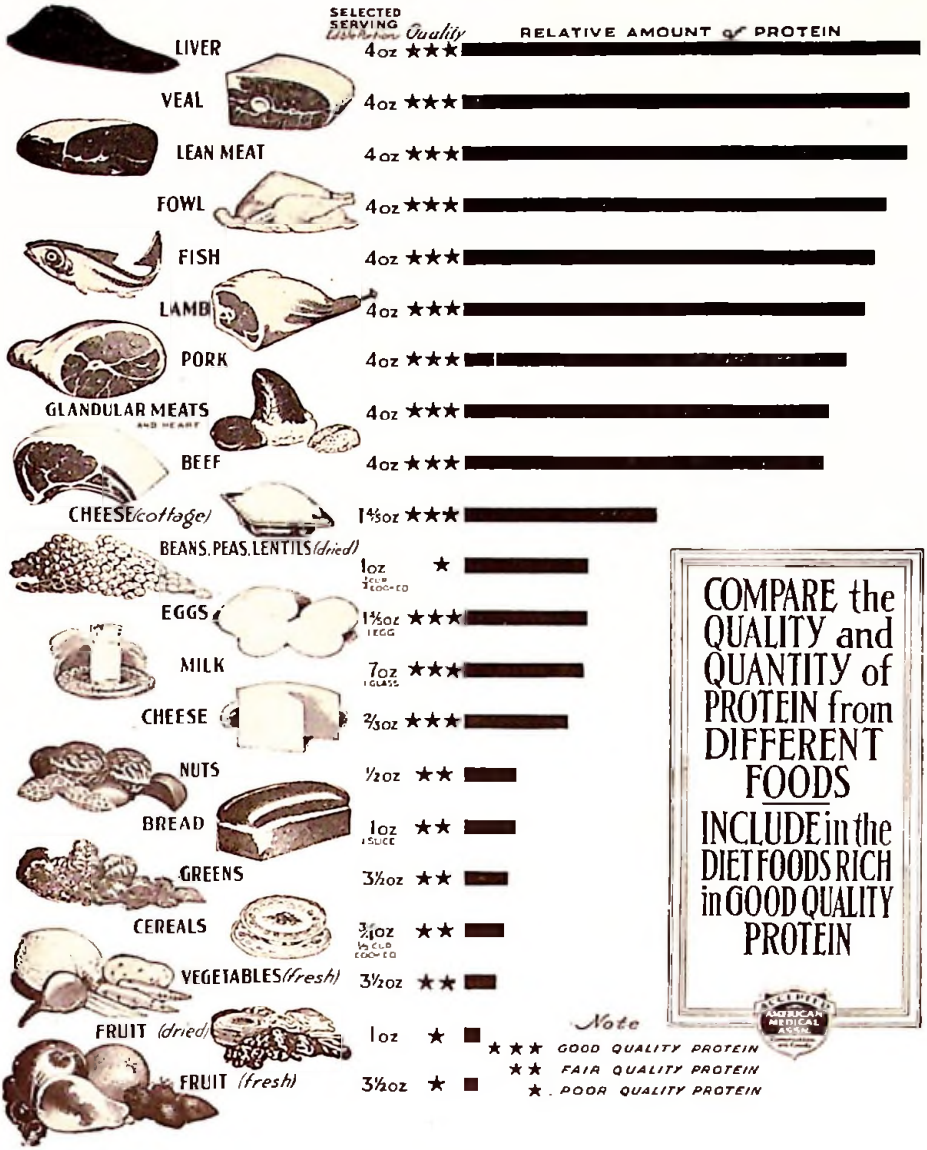
ACCEPTED AMERICAN MEDICAL ASSN

Calories are the heat units used in measuring the energy value of foods.

Carbohydrates, proteins, and fats are the three constituents of food which the body converts into heat and energy.

Fats, producing twice as many calories per unit of weight as the proteins or carbohydrates, increase the calories at a greater rate than do the other nutrients.

PROTEIN

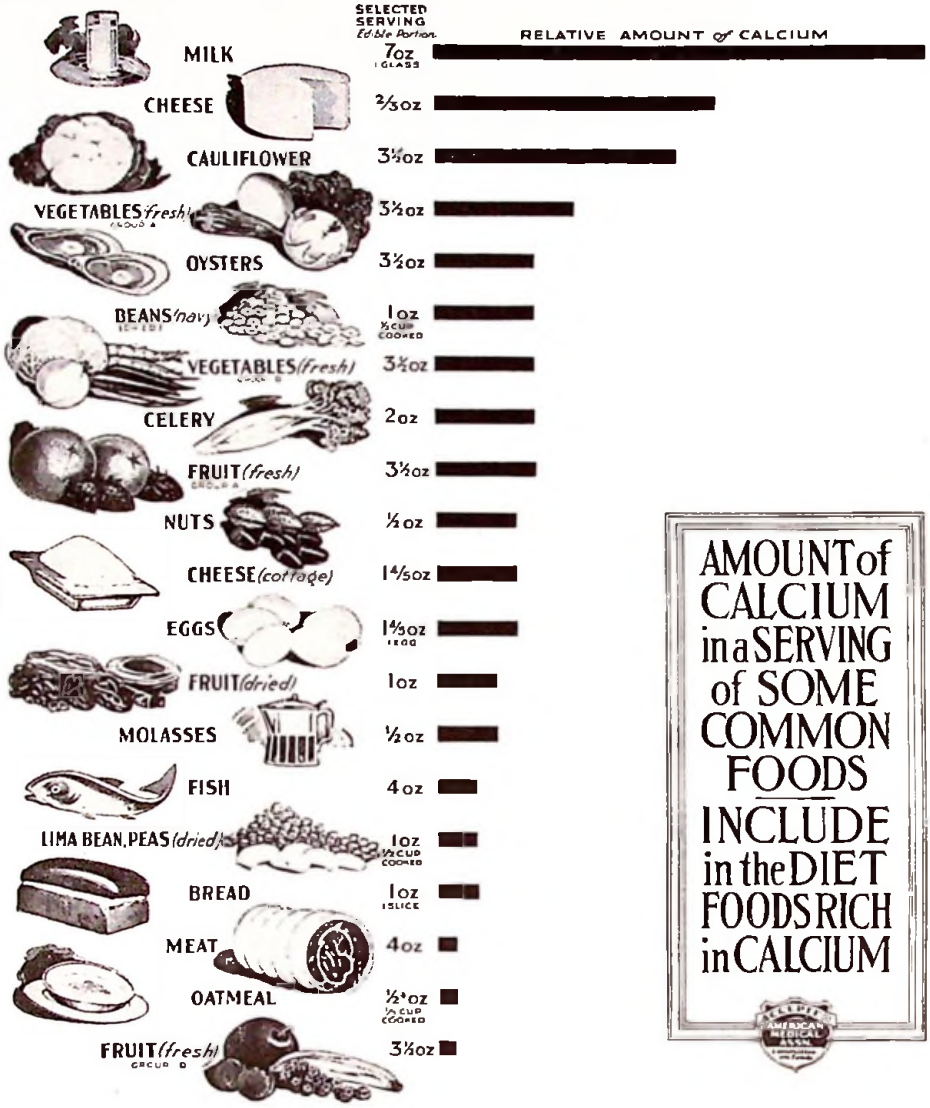


PROTEIN FURNISHES MATERIAL—

—for building new tissue;
—for repairing worn-out tissue;
—for heat and energy.

Animal foods, such as meat, milk, eggs, etc., contain more protein than vegetable foods, and it is of superior quality. Therefore, at least two-thirds of the protein in the diet should be of animal origin.

CALCIUM



AMOUNT of CALCIUM in a SERVING of SOME COMMON FOODS

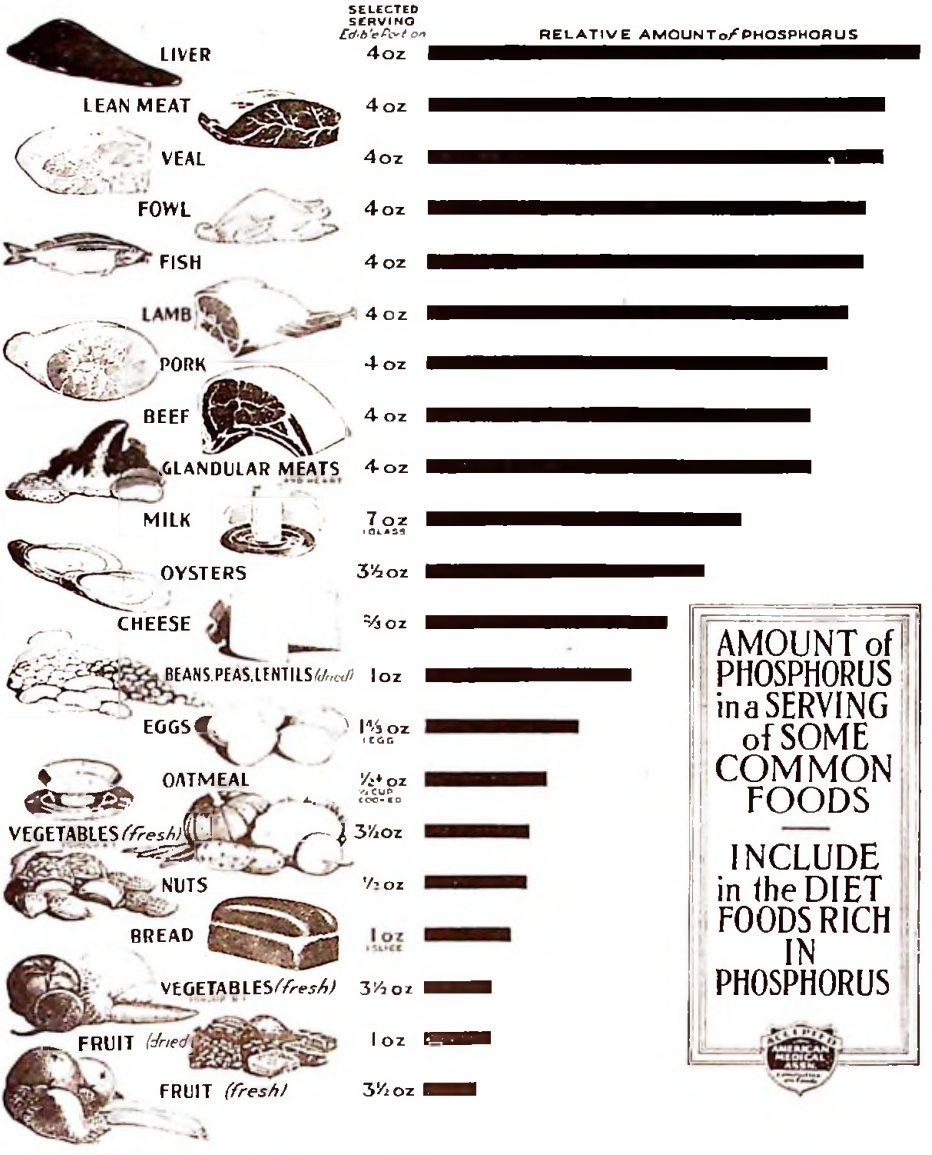
INCLUDE in the DIET FOODS RICH in CALCIUM

CALCIUM IS NECESSARY—

—for the building of straight bones and strong teeth;
—for the regulation of certain body processes;
—for the normal beating of the heart.

An adequate supply of calcium is needed throughout life, but is especially important in childhood, during pregnancy, and during the nursing period, when bones and teeth are being built.

PHOSPHORUS

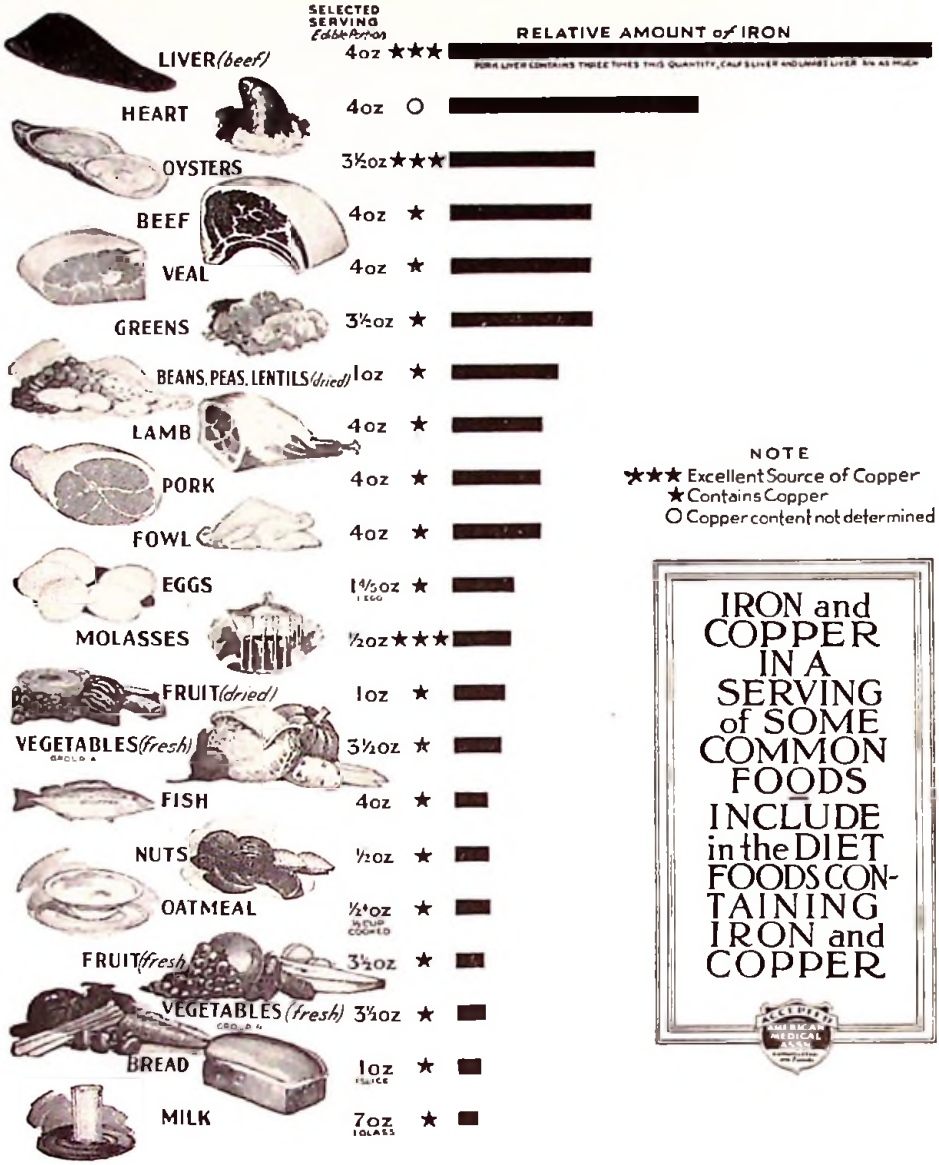


PHOSPHORUS IS IMPORTANT—

—in the building of strong, rigid bones and teeth;
—in the formation of important cell constituents;
—in the regulation of certain reactions of the body.

Phosphorus, like calcium, is necessary throughout life, but is doubly important in childhood, during pregnancy, and during the nursing period. A deficiency may cause rickets and dental decay.

IRON and COPPER



NOTE
★★★ Excellent Source of Copper
★ Contains Copper
○ Copper content not determined

IRON and COPPER IN A SERVING of SOME COMMON FOODS INCLUDE in the DIET FOODS CONTAINING IRON and COPPER

ACCEPTED AMERICAL MEDICAL ASSN.

Iron is necessary for that part of the blood which carries oxygen from the lungs to all parts of the body.

When there is an inadequate supply of iron, a condition known as anemia results, and the blood is unable to do its normal work.

Recent studies seem to indicate that the iron is better used by the body when a very small amount of copper also is present.

VITAMINS

Common Foods as Sources of Vitamins

	A	B	C*	D	G
LIVER	++ to +++	++	+	- to +	+++
GLANDULAR MEATS AND MEATS	+ to ++	++	+?		++ to +++
BEEF	+	++	- to +		++
VEAL	- to +	+?			++
PORK	- to +	+ to ++	?		++
LAMB	- to +	+	- to +		++
OYSTERS	++	++	+	++	++
COD LIVER OIL	++++	-	-	++++	-
EGGS	+++	+ to ++	-?	++	+++
MILK	+++	++	- to +	- to +	+++
BUTTER	+++	-	-	+	-
OLEO MARGARINE (animal fat only)	+++	-	-	- to +	-
WHOLE WHEAT BREAD	++	++			++
APPLES, BANANAS	+ to ++	+ to ++	++		++
ORANGES, GRAPE FRUIT, LEMONS	+ to ++	++	+++		++
STRINGBEANS, PEAS	++	++	++ to +++		- to +
POTATOES	+	++	++		++
CARROTS	+++	++	++		++
LETTUCE	+ to ++	++	+++		++
SPINACH	+++	++	+++	- to +	++
TOMATOES, CABBAGE	++	++	+++		++

* Vitamin C greatly reduced or destroyed by most methods of cooking.

Note
+ contains vitamin ++ good source
+++ excellent source ++++ extraordinary source
- insignificant amount ? doubtful

Vitamins are necessary for the promotion of growth, for the maintenance of health, for the regulation of body processes, and for protection against deficiency diseases.

Vitamin A—improves general resistance.
Vitamin B—prevents certain nervous disorders.
Vitamin C—prevents scurvy and gum inflammation.
Vitamin D—prevents rickets, poor dental development, and dental decay.
Vitamin G—prevents pellagra-like symptoms.

Health Is Best Protected with a Normal Diet

The Needs of the Body. The body has been compared to an engine by some authorities, as it needs material to build it and keep it in repair, fuel to furnish heat and energy, and regulators to keep it functioning properly. Such essentials must be furnished to the "human engine" by food. To meet these needs the food eaten, or the diet, must contain:

Protein—adequate to build and repair muscle tissues. Insufficient protein lowers the body resistance. The effects of a diet deficient in protein may not be obvious for some time, but it causes a constant drainage of body protein which results in an individual feeling below par, physically and mentally, and eventually lowers the body's resistance to disease.

Calcium and Phosphorus—sufficient to build strong bones and teeth. Although symptoms resulting from an inadequate supply of these mineral elements in the diet of an adult may not become apparent for a long time, marked changes take place in the bones and teeth. A deficiency of these elements in the diet of a child causes more serious results. Both of these elements are necessary to build and maintain normal bones and teeth. Efficient utilization of calcium and phosphorus is dependent upon the proper balance between the two elements.

Iron and Copper—sufficient to prevent nutritional anemia. The anemic condition which results from a deficiency of these elements lowers the general resistance of the body.

Vitamins—sufficient for the maintenance of health. These dietary essentials are necessary for the promotion of growth, normal development, and maintenance of health, the regulation of body processes, and for protection against certain nutritional diseases. (The function of each vitamin is listed on the vitamin chart.)

Calories—sufficient to furnish individual energy needs. The requirement is influenced by such factors as age, size, sex, climate, activity, etc. The holding of the body weight within normal limits is an indication of the adequacy or inadequacy of the caloric value of the diet.

Bulk—bulky foods to keep the bowels properly regulated.

The Daily Diet of an Average Adult Should Include

Meat . . . . . 1—2 servings

Milk . . . . . 1—2 glasses

Eggs . . . . . 1—2

Vegetables . . . 2 servings, other than potatoes (1 cooked and 1 raw)

Fruit . . . . . 2 servings (1 cooked and 1 orange or tomato juice)

Meat in the Normal Diet

Meat is important because—

—It furnishes superior quality protein.

—It is high in iron.

—It is rich in phosphorus.

—It contains valuable vitamins.

—It is an excellent source of calories.

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Agricultural Research Bulletin No. 9
July, 1937

The Significance of Jewish Holidays to the Livestock Producer

(Can Be Read in 8 Minutes.)

LIVESTOCK producers have heard that Jewish holidays have an influence on the livestock market. Most of those who have heard this remark assumed that the Jewish people are forbidden to eat meat on these holidays. The abstinence from eating meat, because of requirement, is a minor influence on the livestock market. The main reason why it is not advisable to have too many Kosher type cattle, calves, or lambs on the market just prior to a Jewish holiday is because in all meat packing plants where livestock is Kosher killed for the Jewish trade, it frequently happens that no slaughtering is done on these holidays. Livestock producers also should know that no animals are Kosher slaughtered on Saturdays. Since the Jewish people require a sizable quantity of cattle, calves, and lambs, it will readily be seen that if no slaughtering is done in plants supplying meat for this particular trade that a large number of buyers will be absent from the market whenever these holidays occur. It is primarily for this reason that Jewish holidays have an effect on the livestock market.

On page 8 there appears a list of the various annual Jewish holidays. This table also indicates whether or not there are any livestock Kosher slaughtered on each of these holidays. Information is given relative to the feasting and fasting which occurs on each of the holidays.

It is well to remember that these particular holidays do not come on the same date each year. For that reason there is given, on pages 4 and 5, the dates of each of these holidays for 1937, and each of the succeeding nine years. It should be emphasized that even though the

slaughtering of animals is permitted on certain days of certain holidays that no Kosher slaughtering ever occurs on Saturdays.

Only two of the Jewish holidays are regarded as fast days, these being Tisha B'Ab and Yom Kippur. On these two fast days strictly orthodox Jews do not eat any food or drink any liquid. Yom Kippur is regarded as a very strict fast day. The effect upon the demand for livestock on these days is not entirely that of stopping slaughtering operations. On Tisha B'Ab, slaughtering is permitted. The chief influence of Tisha B'Ab and Yom Kippur on the demand for livestock is that on these days orthodox Jewish people do not consume meat.

It is generally believed by the uninformed that certain foods are eaten on certain Jewish holidays. For example, on some days fish is prescribed, fowl on others, etc. However, this is not the case. On any holiday that is regarded as a feast day, any kind of Kosher meat or food may be consumed. Even though meat consumption is permitted on most of the Jewish holidays, it is a known fact that fowl and fish are the meats commonly consumed on these days. Poultry is a big competitor of beef for the dollars spent by Jewish consumers. This is especially true when the price of beef seems high compared with poultry.

A brief explanation of each of the Jewish holidays follows:

PURIM

This word means "drawing lots." About 404-361 B. C., the chief minister Haman, of a king of Persia by the name of Ahasueros, wanted to massacre the Jews. He was casting lots to determine in which month he would carry out his wishes. In this manner February was selected. Later this was averted by Queen Esther, who informed the King of the plot. The Queen herself was Jewish. Haman was hanged and the Jews saved. The Jews commemorate this by feasting and reading the history of the occasion in the Temples. This holiday lasts only one day.

PASSOVER

This holiday is observed for eight days in commemoration of the deliverance of the Jews from Egypt.

FEAST OF WEEKS

This is a two-day holiday. It comes seven weeks after the first day of Passover. It commemorates the receiving of the Jewish Ten Commandments by Moses.

TISHA B'AB

This is a one-day holiday for mourning the destruction of the Temple and the loss of Jewish independence.

ROSH-HASHANAH

This two-day holiday is the Jewish New Year.

YOM KIPPUR

This is a day of atonement. It is a very strict fast day. Jews must fast for over twenty-four hours. This is largely a week for eating poultry.

FEAST OF TABERNACLES

This is a nine-day holiday including Simhas Torah with the first two and the last two days being regarded as the most important. This holiday commemorates the forty years of wandering in the Desert of Zin after the exodus from Egypt. During this period the people lived in booths or tents.

HANUKAH

This is an eight-day holiday in November and December. It commemorates the purification of the Temple after the defeat of the Syrians by the Jews under the leadership of Judas Maccabeus.

In all there are thirty-two days set aside each year as Jewish holidays. No work is permitted on thirteen of these days which means that there are about two weeks of each year when no livestock is slaughtered for the Kosher trade.

Kosher meats or the meats that are required by the orthodox Jewish people come from plants where the animals are slaughtered and meats prepared under the close supervision of the rabbi or some representative of the religion. The preparation of these meats is a religious rite. Jewish people do not eat pork. They eat beef, veal, and lamb. All animals for this trade are slaughtered by the rabbi or one of his representatives. "Sticking" the animal is not permitted as for the regular Gentile trade. The throat is cut. Following this operation, a careful

Dates of Jewish Holidays

Name of Holiday	1937	1938	1939	1940
Purim	Feb. 25	Feb. 15	Mar. 5	Feb. 23
Passover	Mar. 27	Apr. 16	Apr. 4	Apr. 23
"	Mar. 28	Apr. 17	Apr. 5	Apr. 24
"	Mar. 29	Apr. 18	Apr. 6	Apr. 25
"	Mar. 30	Apr. 19	Apr. 7	Apr. 26
"	Mar. 31	Apr. 20	Apr. 8	Apr. 27
"	Apr. 1	Apr. 21	Apr. 9	Apr. 28
"	Apr. 2	Apr. 22	Apr. 10	Apr. 29
"	Apr. 3	Apr. 23	Apr. 11	Apr. 30
Feast of Weeks	May 16	June 5	May 24	June 12
" " "	May 17	June 6	May 25	June 13
Tisha B'Ab	July 18	Aug. 7	July 25	Aug. 13
Rosh-Hashanah	Sept. 6	Sept. 26	Sept. 14	Oct. 3
" "	Sept. 7	Sept. 27	Sept. 15	Oct. 4
Yom Kippur	Sept. 15	Oct. 5	Sept. 23	Oct. 12
Feast of Tabernacles	Sept. 20	Oct. 10	Sept. 28	Oct. 17
" " "	Sept. 21	Oct. 11	Sept. 29	Oct. 18
" " "	Sept. 22	Oct. 12	Sept. 30	Oct. 19
" " "	Sept. 23	Oct. 13	Oct. 1	Oct. 20
" " "	Sept. 24	Oct. 14	Oct. 2	Oct. 21
" " "	Sept. 25	Oct. 15	Oct. 3	Oct. 22
" " "	Sept. 26	Oct. 16	Oct. 4	Oct. 23
Shmini Azereth	Sept. 27	Oct. 17	Oct. 5	Oct. 24
Simhas Torah	Sept. 28	Oct. 18	Oct. 6	Oct. 25
Hanukah	Nov. 29	Dec. 18	Dec. 7	Dec. 25
"	Nov. 30	Dec. 19	Dec. 8	Dec. 26
"	Dec. 1	Dec. 20	Dec. 9	Dec. 27
"	Dec. 2	Dec. 21	Dec. 10	Dec. 28
"	Dec. 3	Dec. 22	Dec. 11	Dec. 29
"	Dec. 4	Dec. 23	Dec. 12	Dec. 30
"	Dec. 5	Dec. 24	Dec. 13	Dec. 31
"	Dec. 6	Dec. 25	Dec. 14	Jan. 1

rom 1937 to 1946, Inclusive

1941	1942	1943	1944	1945	1946
Mar. 13	Mar. 3	Feb. 19	Mar. 9	Feb. 27	Feb. 15
Apr. 12	Apr. 2	Apr. 20	Apr. 8	Mar. 29	Apr. 16
Apr. 13	Apr. 3	Apr. 21	Apr. 9	Mar. 30	Apr. 17
Apr. 14	Apr. 4	Apr. 22	Apr. 10	Mar. 31	Apr. 18
Apr. 15	Apr. 5	Apr. 23	Apr. 11	Apr. 1	Apr. 19
Apr. 16	Apr. 6	Apr. 24	Apr. 12	Apr. 2	Apr. 20
Apr. 17	Apr. 7	Apr. 25	Apr. 13	Apr. 3	Apr. 21
Apr. 18	Apr. 8	Apr. 26	Apr. 14	Apr. 4	Apr. 22
Apr. 19	Apr. 9	Apr. 27	Apr. 15	Apr. 5	Apr. 23
June 1	May 22	June 9	May 28	May 18	June 5
June 2	May 23	June 10	May 29	May 19	June 6
Aug. 2	July 23	Aug. 10	July 30	July 19	Aug. 6
Sept. 22	Sept. 12	Sept. 30	Sept. 18	Sept. 8	Sept. 26
Sept. 23	Sept. 13	Oct. 1	Sept. 19	Sept. 9	Sept. 27
Oct. 1	Sept. 21	Oct. 9	Sept. 27	Sept. 17	Oct. 5
Oct. 6	Sept. 26	Oct. 14	Oct. 2	Sept. 22	Oct. 10
Oct. 7	Sept. 27	Oct. 15	Oct. 3	Sept. 23	Oct. 11
Oct. 8	Sept. 28	Oct. 16	Oct. 4	Sept. 24	Oct. 12
Oct. 9	Sept. 29	Oct. 17	Oct. 5	Sept. 25	Oct. 13
Oct. 10	Sept. 30	Oct. 18	Oct. 6	Sept. 26	Oct. 14
Oct. 11	Oct. 1	Oct. 19	Oct. 7	Sept. 27	Oct. 15
Oct. 12	Oct. 2	Oct. 20	Oct. 8	Sept. 28	Oct. 16
Oct. 13	Oct. 3	Oct. 21	Oct. 9	Sept. 29	Oct. 17
Oct. 14	Oct. 4	Oct. 22	Oct. 10	Sept. 30	Oct. 18
Dec. 15	Dec. 4	Dec. 22	Dec. 11	Nov. 30	Dec. 18
Dec. 16	Dec. 5	Dec. 23	Dec. 12	Dec. 1	Dec. 19
Dec. 17	Dec. 6	Dec. 24	Dec. 13	Dec. 2	Dec. 20
Dec. 18	Dec. 7	Dec. 25	Dec. 14	Dec. 3	Dec. 21
Dec. 19	Dec. 8	Dec. 26	Dec. 15	Dec. 4	Dec. 22
Dec. 20	Dec. 9	Dec. 27	Dec. 16	Dec. 5	Dec. 23
Dec. 21	Dec. 10	Dec. 28	Dec. 17	Dec 6	Dec. 24
Dec. 22	Dec. 11	Dec. 29	Dec. 18	Dec. 7	Dec. 25

physical examination, from a religious health standpoint, is made of all parts of the carcass. Particular attention is given the lungs and stomach. If the lungs will not hold air, or if any lesions are found any place in the body, if the animal's stomach is pierced by mechanical means or by disease, the meat of the particular animal does not meet the requirements of the Kosher trade. It is, therefore, then known as "trafeh" which means forbidden food. If passed by the federal government inspectors as suitable for food, the "trafeh" meat then is used by the Gentile trade. Upon the other hand, the Hebrew word "Kosher" means "clean."

The Jewish trade uses only those cuts which come from the forequarter of the carcass. This is because meat must have the veins removed before it can be eaten by orthodox Jewish people. It is much easier to devein forequarters than hindquarters. There is no rule which prevents the meat from a hindquarter being consumed by orthodox Jews, but in order to devein a hindquarter, it is necessary to cut it up into such small pieces that it is very unattractive and unsuitable for anything but ground meat or stews. Hence the practice has been to use only the forequarters.

Beef carcasses for the Kosher trade in New York City, Chicago, and Philadelphia are separated, leaving one rib on the hindquarters and twelve on the forequarters. This method of cutting places approximately 52 per cent of the entire weight of the carcass in the two forequarters. Kosher lamb and veal carcasses are also cut with one rib on the hindquarters. Approximately 50 per cent of the lamb carcass and 50 per cent of the veal is in the Kosher forequarters.

Cuts for the Kosher trade are usually sold very soon after slaughter because fresh Kosher meat is normally consumed within seventy-two hours after slaughter. It is a common thing to see retail buyers of Kosher meats trading and buying on the killing floor or as the carcasses first enter the coolers. They buy Kosher meats at this time because it takes less work to prepare them in conformity with the requirements of the Jewish religion. Also it is much easier to devein the meat while it is still warm than after it has become chilled. From this it might be concluded that Jewish regulations require that the meat be consumed within seventy-two hours after slaughter. However, this is not a definite requirement as the meat may be washed twice, extending the seventy-two hour period each time. The washing is done by the

rabbi or one of his representatives and is referred to as "begiss," which means "to wash." Kosher butchers and housewives may also do this.

Kosher sausage and prepared meats, which take much longer than three periods of seventy-two hours each to make, are handled so as to make them Kosher indefinitely. These meats are deveined, soaked in water one-half hour, then sprinkled with salt and let stand for an hour, then washed thoroughly, and they become Kosher indefinitely. However, all of this must be done under the supervision of representatives of the faith.

It is generally known that Saturday is regarded as a holy day by the Jews, it being similar to the Gentile Sunday. Saturdays, like any other Jewish holiday, are observed from Friday sundown until Saturday sundown. Sundown ends the Jewish day rather than 12:00 o'clock midnight according to the Gregorian calendar. Following sundown on Saturday, business operations may be carried on. However, no business is ever transacted on Sundays when a "non-working" holiday occurs on that day.

It is difficult to determine just how many Jewish people there are in the United States who would be regarded as strictly orthodox Jews. It is estimated that there are, in New York City, between 1,500,000 and 2,000,000 Jewish people and about 50 per cent are orthodox. No doubt if an accurate count of the entire United States could be made, if would be found that there are several million Jewish people who consume nothing but Kosher meat. Consideration of this number leads one to realize the importance and necessity of becoming familiar with the various Jewish holidays and trying to avoid having livestock on a market when buyers for this trade are "out of the market."

The information given in the tables on pages 4, 5, and 8 should enable livestock producers to do a better job of marketing their livestock. Producers know generally or can find out how many days their cattle are away from New York City and other markets in which cattle, lambs, and calves are Koshered for the Jewish people. Having in mind this information and the dates at which the different holidays occur, producers can withhold their animals from the markets on the days that there is no demand from Kosher slaughterers. It is believed that this information will be of great help to producers in the marketing of their livestock.

JEWISH HOLIDAYS

(There is never any Kosher slaughtering of livestock on Saturdays)

Name of Holiday		Feast or Fast	Slaughtering or No Slaughtering
Purim		Feast	Slaughtering
Passover	1st day	Feast	No slaughtering
"	2nd "	"	" "
"	3rd "	"	Slaughtering
"	4th "	"	"
"	5th "	"	"
"	6th "	"	"
"	7th "	"	No slaughtering
"	8th "	"	" "
Feast of Weeks	1st day	Feast	No slaughtering
" " "	2nd "	"	" "
Tisha B'Ab		Fast	Slaughtering
Rosh-Hashanah (New Year)	1st day	Neither	No slaughtering
" " " "	2nd "	"	" "
Yom Kippur		Strict Fast	No slaughtering
Feast of Tabernacles	1st day	Feast	No slaughtering
" " "	2nd "	"	" "
" " "	3rd "	"	Slaughtering
" " "	4th "	"	"
" " "	5th "	"	"
" " "	6th "	"	"
" " "	7th "	"	"
Shmini Azereth		Feast	No slaughtering
Simhas Torah		Feast	No slaughtering
Hanukah	1st day	Feast	Slaughtering
"	2nd "	"	"
"	3rd "	"	"
"	4th "	"	"
"	5th "	"	"
"	6th "	"	"
"	7th "	"	"
"	8th "	"	"

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Agricultural Research Bulletin No. 10 November, 1937

Lamb By-products

(Can be read in 8 minutes)

SINCE earliest times, sheep have been a very important factor in the progress and development of civilization. They provide man with two necessities of life—food and clothing.

Sheep were first grown for their wool; later, food and wool. Today they are also the raw material for a large number of valuable commodities. For example, it is quite within the range of possibility for lambs raised on a western ranch and fattened in a mid-western feed lot to furnish wool for a New York man's suit, strings for the violins of an orchestra in Philadelphia, "sheepskins" for the diplomas of a graduating class in Texas, sweat bands for the hats of citizens of Alabama, cosmetics, gloves, and shoes for the movie actresses in Hollywood, strings for the tennis champion's racket at Wimbledon, surgical ligatures, and many valuable pharmaceuticals for doctors everywhere, and on and on.

In early days many of the inedible as well as edible by-products were disposed of by being given away. When a larger quantity of these were produced than the people living nearby could consume, the surplus products were thrown into the river, or carted away and buried in trenches.

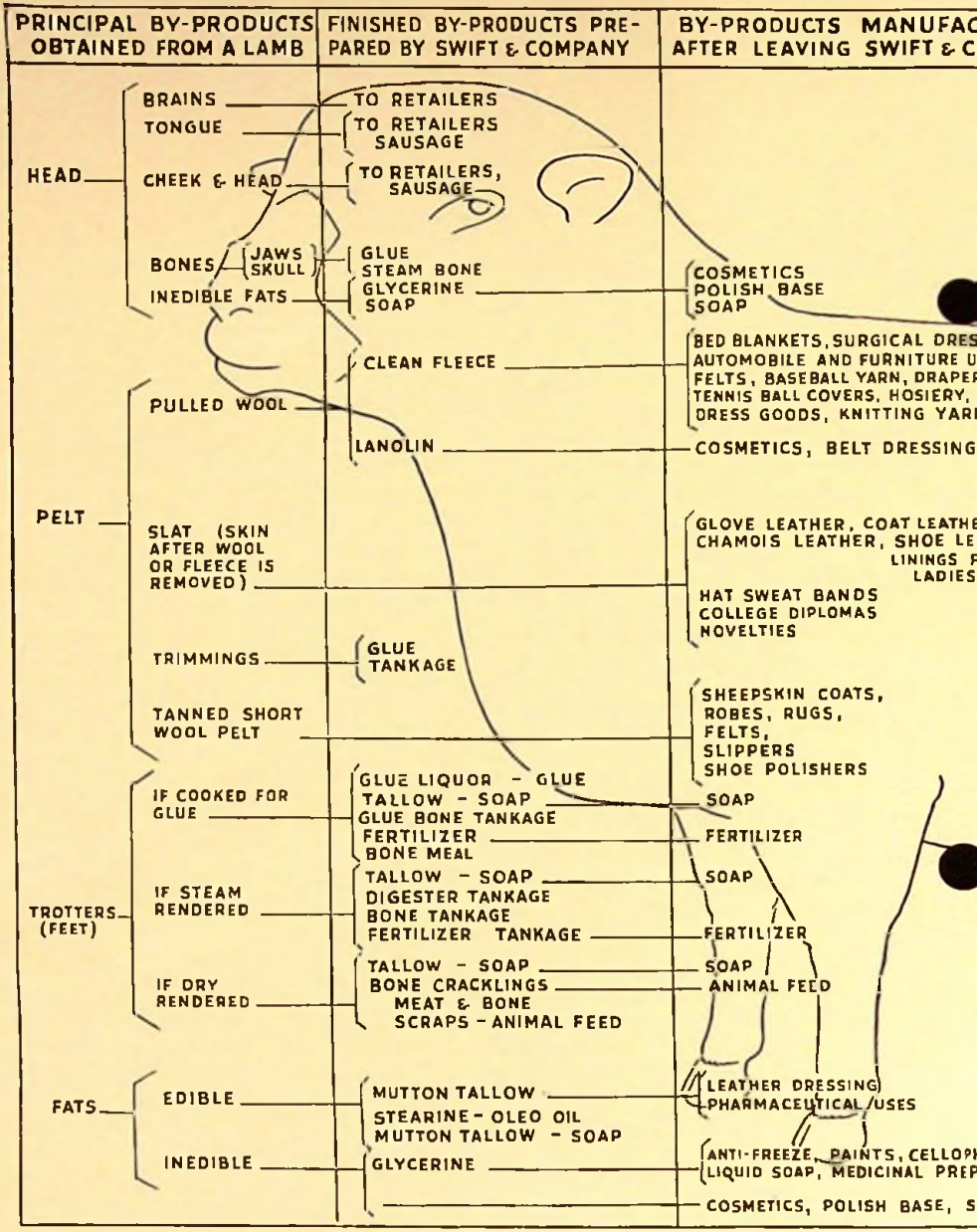
All meat packing plant products that have value, with the exception of dressed meat, are called by-products. Wool and skins, known as "pelts," are the most valuable lamb by-products.

Some waste still goes on in smaller plants where the number of lambs and other animals handled is too small to warrant extensive by-product operations. In the larger plants, however, there is no waste; not a single element of value is discarded. This statement is made despite the fact that there is an average of from 20 to 25 pounds of unrecoverable loss in every 100 pounds of live lamb handled by meat packers.

The relationship of the value of by-products to the total value of the meat and by-products varies with the kind of livestock. The following table shows the average percentage distribution of the total money received by meat packers for the meat, edible by-products, inedible by-products, and hides or pelts of lambs, hogs, calves, and cattle:

	Carcass Meat	*Edible By-products*	*Inedible By-products*	*Hide or Pelt*	*Total*
Cattle	85.2	5.3	1.7	7.8	100
Lambs	74.6	3.0	3.8	18.6	100
Calves	75.6	7.5	1.5	15.4	100
Hogs	96.3 (includes lard)	2.2	1.5	...	100

LAMB BY


PRINCIPAL BY-PRODUCTS OBTAINED FROM A LAMB
FINISHED BY-PRODUCTS PREPARED BY SWIFT & COMPANY
BY-PRODUCTS MANUFAC
AFTER LEAVING SWIFT & C
HEAD
BRAINS
TONGUE
CHEEK & HEAD
BONES
JAWS
SKULL
INEDIBLE FATS
TO RETAILERS
TO RETAILERS SAUSAGE
TO RETAILERS, SAUSAGE
GLUE
STEAM BONE
GLYCERINE
SOAP
COSMETICS
POLISH BASE
SOAP
PELT
PULLED WOOL
CLEAN FLEECE
LANOLIN
BED BLANKETS, SURGICAL DRES
AUTOMOBILE AND FURNITURE U
FELTS, BASEBALL YARN, DRAPER
TENNIS BALL COVERS, HOSIERY,
DRESS GOODS, KNITTING YARI
COSMETICS, BELT DRESSING
SLAT (SKIN AFTER WOOL OR FLEECE IS REMOVED)
TRIMMINGS
TANNED SHORT WOOL PELT
GLUE
TANKAGE
GLOVE LEATHER, COAT LEATHE
CHAMOIS LEATHER, SHOE LE
LININGS F
LADIES
HAT SWEAT BANDS
COLLEGE DIPLOMAS
NOVELTIES
SHEEPSKIN COATS,
ROBES, RUGS,
FELTS,
SLIPPERS
SHOE POLISHERS
TROTTERS (FEET)
IF COOKED FOR GLUE
IF STEAM RENDERED
IF DRY RENDERED
GLUE LIQUOR - GLUE
TALLOW - SOAP
GLUE BONE TANKAGE
FERTILIZER
BONE MEAL
TALLOW - SOAP
DIGESTER TANKAGE
BONE TANKAGE
FERTILIZER TANKAGE
TALLOW - SOAP
BONE CRACKLINGS
MEAT & BONE SCRAPS - ANIMAL FEED
SOAP
FERTILIZER
SOAP
FERTILIZER
SOAP
ANIMAL FEED
FATS
EDIBLE
INEDIBLE
MUTTON TALLOW
STEARINE - OLEO OIL
MUTTON TALLOW - SOAP
GLYCERINE
LEATHER DRESSING
PHARMACEUTICAL USES
ANTI-FREEZE, PAINTS, CELLOPH
LIQUID SOAP, MEDICINAL PREP
COSMETICS, POLISH BASE, S

PRODUCTS

PRINCIPAL BY-PRODUCTS OBTAINED FROM A LAMB	FINISHED BY-PRODUCTS PREPARED BY SWIFT & COMPANY	BY-PRODUCTS MANUFACTURED AFTER LEAVING SWIFT & COMPANY
BLOOD — FRESH — SAUSAGE		ALBUMIN—WEATHERPROOF GLUE; SERUM, PHARMACEUTICAL USES (MEDICINES)
BLOOD — DRIED	BLOOD FLOUR, BLOOD MEAL, ANIMAL FEED	PLASTER RETARDANT
CASINGS	SAUSAGE CONTAINERS	STRINGS OF MUSICAL INSTRUMENTS; TENNIS RACKET STRINGS; SURGICAL LIGATURES (CATGUT); PHARMACEUTICAL USES
FANCY MEATS — HEART	TO RETAILERS, SAUSAGE	ANIMAL FEED
FANCY MEATS — LIVER	TO RETAILERS, SAUSAGE	ANIMAL FEED
FANCY MEATS — SWEETBREADS (NECK & HEART)	TO RETAILERS	
FANCY MEATS — KIDNEYS	TO RETAILERS, SAUSAGE	
FANCY MEATS — STOMACH		ANIMAL FEED
FANCY MEATS — PLUCK: LUNG	TO RETAILERS	
FANCY MEATS — PLUCK: LIVER	TO RETAILERS	
FANCY MEATS — PLUCK: HEART	TO RETAILERS	
FANCY MEATS — MELT		ANIMAL FEED
FANCY MEATS — FRIES	TO RETAILERS	
GLANDS — PITUITARY, THYROID, OVARIES, PANCREAS, SUPRARENALS		PHARMACEUTICAL USES (MEDICINE)

SUMMARY

	POUNDS OF PRODUCT IN AVERAGE LAMB	PCT. OF FINISHED PRODUCT TO LIVE LAMB
1. DRESSED LAMB (CARCASS)	39.5	47.0
2. EDIBLE BY-PRODUCTS		
TONGUE, LIVER, HEART, SWEETBREADS, BRAINS	1.7	2.0
OLEO OIL AND STEARINE	2.0	2.4
3. INEDIBLE BY-PRODUCTS		
PELT — WOOL	4.0	4.7
PELT — SKIN	5.5	6.6
FATS: RENDERED TALLOW, OIL AND GREASE	.6	.7
SOFT BONES	.5	.6
TROTTERS	1.3	1.5
BLOOD (DRIED)	.7	.8
CASINGS (FINISHED)	.5	.6
TANKAGE	2.4	2.8
VALUELESS MATERIAL AND SHRINKAGE	25.3	30.3
TOTAL	84.0	100.0

These figures are based on June, 1937 prices. It should be understood that the percentage return from meat and the different kinds of by-products varies from year to year.

From these figures it will be seen that the by-products from a lamb represent 25.4 per cent of the total value of all products the lamb contains. This is a larger proportion than will be found in the case of any other livestock. It is interesting to note that 18.6 per cent of the value of lamb products is derived from pelts alone and 6.8 per cent from other by-products.

A chart is given on Pages 2 and 3 which lists the principal by-products of a lamb and the uses made of them. A large number of animals is required to make a small amount of many of the by-products listed, and much labor and expense is necessary to save and prepare them for final use.

For example, the glands from more than 100,000 lambs are necessary to produce one pound of adrenalin, a powerful heart stimulant which, in many instances, has been known to cause a heart that has stopped to resume its beating.

Large quantities of lamb casings are used in the manufacture of tennis rackets. Only the best quality casings can be used for this purpose since each string that is used in a tennis racket must stand a breaking test of one hundred pounds. In addition to this the strings for the racket must also have sufficient stretching ability so that the racket will have plenty of "snap" and "vim" to it.

It will be seen from the chart that casings from lambs are also used in the manufacture of strings for violins, cellos, harps, ukeleles, and other musical instruments. Scientists discovered years ago that lamb casings make excellent surgical ligatures. The strong, silky side of the narrow casings are used for this purpose. These ligatures, or strings, are used by surgeons during an operation in tying the blood vessels to prevent loss of blood. Lamb casings are especially valuable for this purpose because of the fact that the thread is taken up or absorbed by the flesh while the wound is healing. In this way, by the time the wound has healed the stitches will have practically disappeared. The value of these and other pharmaceutical products to man can never be adequately expressed in terms of dollars and cents.

Few industries have been so successful in the elimination of waste as has the meat-packing business. It is on the basis of the combined value of the meat and by-products, and not merely on their food value, that sheep and lambs are purchased.

The result is that the producer gets better prices for his sheep and lambs than he could obtain if the inedible portions were not fully utilized. At the same time, the consumer also benefits in that he pays less for lamb than he would pay if live lambs were purchased on the basis of only their food value.

Often, depending on the value of by-products, meat packers have been able to pay the producer more for his sheep and lambs than was obtained from the meat.

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Lamb Feeding

(Colorado-Nebraska Area)

Can be read in 8¼ minutes.

IF some one were to ask you what two states rank the highest in respect to numbers of sheep and lambs fed for market, what would your answer be? Perhaps your familiarity with the situation would enable you to reply correctly and say, "Colorado and Nebraska." However, the extent of sheep and lamb feeding operations in these two states, particularly Colorado, is probably not generally appreciated, even among men quite familiar with the livestock industry.

Over a period of years, Colorado has averaged to feed well over one-fourth of all sheep and lambs fed in the United States. Colorado's sheep and lamb feeding operations have exceeded one-third of the United States totals four different years during the past twelve.

Nebraska, the second ranking sheep and lamb feeding state, usually feeds between twelve and fifteen per cent of the total number fed in the United States.

Livestock feeding operations in Iowa, Illinois, Missouri, Indiana, or Minnesota are not centered in a few small areas of each state, but are quite well distributed over the entire state. Practically the opposite is true in Colorado, Nebraska, and Wyoming. Here we find the feeding activities concentrated, for the most part, in areas along certain river valleys.

Northern Colorado represents the most important sheep and lamb feeding section in the United States. This area consists of parts of Larimer, Weld, Boulder, Morgan, Logan, and Sedgwick counties, and a small part of Washington and Phillips counties. More lambs are fed in Larimer and Weld counties than in any other counties in any

state; in fact, there are usually more lambs fed in each of these two counties than in any Corn Belt state other than Nebraska. The bulk of the feeding in northern Colorado is centered around the following cities: Fort Collins, Greeley, Loveland, Fort Morgan, and Sterling.

For years, the western part of the northern Colorado feeding area was in a class by itself from the standpoint of numbers of lambs fed. However, during more recent years the Fort Morgan and Sterling districts have become more prominent. On January 1, 1937, approximately 21% of all lambs on feed in northern Colorado were fed in Morgan, Logan, and Sedgwick counties, whereas on January 1, 1922, only about 9% of northern Colorado's lambs were being fed in these same three counties.

The Arkansas Valley of southeastern Colorado is recognized as another important lamb feeding territory. This section is regarded as practically a continuous stretch of land extending along the Arkansas River from a few miles east of Pueblo on east to the Kansas state line. Parts of the following six counties make up this territory: Pueblo, Otero, Bent, Prowers, Crowley, and Kiowa. The heaviest feeding is carried on around the cities of Lamar, Las Animas, and Rocky Ford.

Two other lamb feeding sections in Colorado deserve recognition. One of these is the San Luis Valley, and the other, the Western Slope section. The San Luis Valley is located in south-central Colorado. This territory includes parts of Saguache, Rio Grande, Alamosa, Conejos, and Costilla counties, and is centered around the cities of Monte Vista, Center, Alamosa, and Antonito. The Western Slope area is situated in west-central Colorado. Parts of Mesa, Delta, and Montrose counties make up this territory. Grand Junction, Delta, and Montrose are the principal centers of the Western Slope feeding territory.

The estimated number of sheep and lambs on feed January 1 of each year since 1921 for each of the different sections of Colorado was as follows:

Year	Northern Colorado	Arkansas Valley	San Luis Valley	Western Slope	Miscellaneous Sections	State Total
1922	760,000	225,000	30,000	25,000	.....	1,040,000
1923	1,175,000	235,000	65,000	25,000	.....	1,500,000
1924	1,150,000	170,000	55,000	25,000	.....	1,400,000
1925	1,250,000	265,000	60,000	25,000	.....	1,600,000
1926	1,090,000	285,000	75,000	25,000	.....	1,475,000
1927	520,000	177,000	54,000	19,000	.....	770,000
1928	1,265,000	275,000	30,000	10,000	.....	1,580,000
1929	1,100,000	385,000	22,000	13,000	.....	1,520,000
1930	1,490,000	475,000	45,000	25,000	.....	2,035,000
1931	975,000	360,000	90,000	80,000	45,000	1,550,000
1932	1,100,000	375,000	50,000	25,000	40,000	1,590,000
1933	955,000	330,000	65,000	40,000	10,000	1,400,000
1934	835,000	300,000	60,000	40,000	15,000	1,250,000
1935	820,000	200,000	10,000	30,000	5,000	1,065,000
1936	980,000	180,000	45,000	35,000	10,000	1,250,000
1937	750,000	175,000	45,000	45,000	15,000	1,030,000

Source: Bureau of Agricultural Economics (Denver Office)

There are two well-known sheep and lamb feeding sections in Nebraska—the North Platte Valley and Central Nebraska territories. The North Platte Valley area, which centers around the city of Scottsbluff, is by far the more important of these two. The North Platte Valley, or Scottsbluff, section is not large but is looked upon as one of the most important sheep and lamb feeding sections in the United States. This territory consists of Scottsbluff and Morrill counties in Nebraska, and Goshen county in Wyoming, with some few feeders in adjoining counties on the east and west. The principal cities in this feeding section are Scottsbluff, Morrill, Mitchell, and Oshkosh in Nebraska, and Torrington in Wyoming. The main portion of this territory is represented by a strip of land along the North Platte River about 12 to 15 miles wide and extending from Torrington, Wyoming, to Bridgeport, Nebraska.

The following figures, showing the number of sheep and lambs fed in the Scottsbluff area each year for the past six, will clearly show the importance of this feeding section:

Year	*No. Sheep and Lambs Fed*
1937	315,000
1936	445,000
1935	395,000
1934	330,000
1933	420,000
1932	385,000
1931	310,000

Source: Bureau of Agricultural Economics (Denver Office)

Lamb feeding operations in the Central Nebraska area are not concentrated near a few well-recognized points as they are in the feeding territories previously referred to. Lambs are fed at various points in the Platte River Valley of Central Nebraska. From Gothenburg on the west this feeding section extends to the east, including such cities and towns as Cozad, Lexington, Kearney, Wood River, Grand Island, and Central City. As a rule, between 150,000 and 250,000 lambs are fed in this territory each year. The total number dropped to about 76,000 in 1934 but this was due to the drouth which was particularly hard on all crops in this section.

In this western country lambs and cattle are fed in large numbers in valleys where water is available for irrigation purposes, where an abundance of high-quality alfalfa hay can be produced, and as a rule, where a large volume of sugar beets is grown.

Lamb feeding operations in Colorado and Nebraska are usually quite closely associated with sugar beet production; however, some lambs may be fattened without receiving any part of the sugar beet plant.

The usual feeding program for lambs includes the use of sugar beet tops, and both wet and dry beet pulp. The extent to which wet beet pulp is used depends primarily upon the distance the feeder is located from the sugar factory and the volume of pulp available. Price would be the chief limiting factor to the use of dry beet pulp.

Feeders usually start to receive lambs between the middle of September and the first part of October. It is along about this same time that tops are being removed from the sugar beets. Lambs usually receive sugar beet tops when started on feed. The sugar factories are in operation before the supply of tops is exhausted, so feeders can go from sugar beet tops to the use of wet beet pulp and some grain. A little later alfalfa hay is added to the ration. Lambs are then finished on dry beet pulp, alfalfa hay, and barley or corn; or on a dry ration consisting of alfalfa hay, cottonseed cake, and barley or corn.

A study of the source of feeder lambs fed in the Colorado and Nebraska feed lots reveals points of origin at quite widely separated sections in the western states. Most of the feeder lambs come from Wyoming, Montana, western Colorado, Utah, and New Mexico; however, at times there are rather large numbers of Texas, Oregon, or Idaho lambs moved into the Colorado-Nebraska feeding sections.

No particular weight, type, or grade of lambs is bought for feeding purposes as a rule. The buyer generally takes anything where the price is attractive and he thinks he can make some money. The man selling feeder lambs may make a rough sort of his lambs before offering them for sale, but this is not the common practice. The feeder buyer contracts for a certain number of lambs with a certain grower for delivery on a specified date. These contracts are usually entered into during the spring or early summer calling for delivery of the lambs in the fall. Since these lambs are not readily available for inspection, the buyer must depend on the reputation of the grower to have some idea of the kind of feeder stock he will get. The weight and condition of lambs when placed in the feed lots in the fall usually varies from year

to year in accordance with the kind of weather experienced during the time lambs are on the range.

Lambs are usually moved into the feed lots in Colorado and Nebraska between about September 20 and the middle of November with the bulk of the movement during October. In view of the large numbers moved in a comparatively short period of time, practically all feeder stock is shipped by rail.

The length of the feeding period is chiefly dependent upon the condition of the lambs when placed in the feed lots, the price of feeds in relation to the price of lambs, and the amount of feed the feeder has at his disposal or can find easily obtainable. Lambs are commonly fed for at least 90 days. However, the feeding period may be lengthened considerably if the feeder decides early in the feeding period to hold his lambs for a change in the market. Again, some lambs finish quicker than others. While some lambs may be ready to market in 90 days, others handled in the same way may require 120 days. In view of this fact, feeders usually sort out their finished lambs at regular intervals, say once a week, and ship them to market. This sorting procedure will continue until the feeder gets down to his "tail-enders" or culls, then they may be sold in one group. Some of the larger feeders may start selling lambs in this way along in January and continue to ship almost every week until cleaned up usually along about the latter part of April or the middle of May. The price of lambs has an influence upon the time lambs will be sold and at what rate.

The market used by Colorado and Nebraska feeders depends mainly upon freight rates as they apply to certain points, or, in other words, on the location of feed lots in respect to railroads.

Feeders in the North Platte Valley and Central Nebraska usually ship their lambs to St. Joseph or Omaha. The St. Joseph market has been very popular with these feeders in recent years. A few lambs are shipped to Sioux City or Chicago.

Lambs from the Fort Morgan and Sterling feeding areas in Colorado are generally shipped to St. Joseph or Chicago, with some going to Omaha and Sioux City. Feeders around Greeley and Fort Collins, Colorado, usually ship their lambs to Denver, St. Joseph, or Chicago with a few going to Omaha. The Western Slope feeding section and the San Luis Valley ship largely to Denver. St. Joseph, Kansas City, or Omaha may, however, be patronized at times. Practically all of the lambs from the Arkansas Valley territory are sold on the Kansas City or St. Joseph markets.

In view of the seasonal marketing of lambs it is well for lamb feeders to consider what competition they might have from other feeding sections, that is, what sections are usually moving lambs to market at the time they expect to be shipping theirs. Since the Colorado-Nebraska lamb feeders handle such a large percentage of the total number of lambs fed in the United States, it is thought that an understanding of how these people operate would be of value to feeders from other sections, in that more uniform marketing might result from a consideration of these operations.

Normally, most of the Colorado-Nebraska lambs are sold during January, February, and March; however, this movement may be delayed at times due to the reasons previously cited. Again, conditions in other parts of the country (particularly California) might be very desirable for lamb production and, as a result, lambs from these sections will develop rapidly and may be moving in competition with those from Colorado, Nebraska, and feed lots in adjoining states.

A careful study of lamb marketing is probably equally as important as having a thorough understanding of the buying and production phases of the business.

Swift & Company
Chicago

Agricultural Research Bulletin No. 12
November, 1937.

Soap

(Can be read in 9 minutes.)

AMERICANS are the world's champion users of soap. If all the soap used by the people of the United States in one year were to be loaded onto box cars, at regulation load weights, the train would reach from Chicago to Pittsburgh, a distance of approximately 475 miles. What a lathering that much soap would make!

The nation's total soap production in 1935, the most recent year for which complete figures are available, amounted to approximately 3,000,000,000 pounds or 23½ pounds per person. This amount was divided into 9 pounds of laundry soap, 3½ pounds of soap chips and flakes, 4 pounds of granulated and powdered soap, 3 pounds of toilet soap, 1½ pounds of cleansing and scouring powders, 1½ pounds of washing powders, and 1 pound of miscellaneous soaps. These figures are approximate.

The latest United States Bureau of Census figures show that there were 238 soap factories in the United States in 1935. These factories spent $140,000,000 for raw material, fuel, and other supplies; paid wages of $15,000,000 to approximately 14,000 employes; and turned out products worth a total of more than $211,000,000.

Soap has not always been as plentiful as it is today. In fact, this present household necessity is essentially a product of modern times. With the possible exception of Rome, soap played a very minor part in the sanitation program of early peoples, although it is mentioned in several historical documents. The earliest reference appears in the works of Pliny, the great Roman historian. Writing in the first century A. D., Pliny mentions the hard and soft soaps used by the French and German tribes which inhabited the regions around the Rhine River.

At about this same time, say some modern writers, soap was discovered in the soil of Sapo Hill near Rome. The discovery was made by a group of Roman housewives who, having abandoned their usual laundry spot, had brought the family washing to the creek flowing past the foot of Sapo Hill. Rubbing handfuls of soil into their clothes in the usual way, they were overjoyed to find that this common earth from the creek banks had unusual cleansing powers when mixed with water. Instead of making clothes dirtier, it actually made them cleaner! At first this marvelous cleansing power was attributed to the favor of the Roman Gods to whom sacrifices were offered up from the top of Sapo Hill. But someone, who must have been a scientist of the day, later found that these miraculous qualities were caused by soap that had resulted from the sacrifices at the top of the Hill. When a burnt sacrifice was offered up—a very frequent occurrence—melted animal fats mixed with wood ashes in the debris. Rains turned the ashes to lye, which in turn acted upon the animal fats to form a crude soap. Erosion carried the soap down the hill to the creek where it was discovered by the housewives.

After the discovery of soap and the rudiments of its chemical make-up at Sapo Hill, the enterprising Romans set about to find ways and means of manufacturing this magic cleanser in commercial quantities. Goat tallow and ashes seem to have been the best of the raw materials available. Historical reports of the venture are meager, but we may safely assume that the industry eventually grew to considerable size, for it was in Rome that soap first came into common usage. One of the old soap factories has recently been unearthed at Pompeii.

According to some historians, the manufacture and use of soap practically died out in Europe following the collapse of the Roman Empire. It was religion, indirectly, that caused soap to fall into disuse. So viciously were the early Christians persecuted by their Roman rulers that they came to despise anything savoring of Rome

and its oppressive corruption. Consequently, with the decay of Rome and the rise of Christianity, many Roman habits and customs became "taboo." Frequent bathing with the use of soap was one of the first Roman customs to be banned. To the early Christian mind, the use of soap in frequent washing of clothes and body was too closely associated with wicked Rome. The result was that for many centuries godliness and cleanliness, now so closely linked together, stood far apart in the social scale.

Strangely enough, it was Christianity that eventually reintroduced soap into Europe. When Godfrey's little band of Crusaders successfully stormed the walls of the Holy City in 1099, they found a people who had long enjoyed the health and comfort of frequent baths with soap and water. All of this was new to the Crusaders—but not for long. When they turned homeward once again, the Knights of the Holy Cause carried Oriental soaps as regulation equipment. Those who were fortunate enough to reach their homelands again were objects of great curiosity, and no small amount of unfavorable comment. Back in the Christian mind still lingered the unfortunate connection between frequent bathing and the moral corruption of Rome. But conversions to the new creed of health were rapidly made and it was not long until soap came back into public favor.

When good etiquette and the Church came gradually to frown upon accumulation of dirt and grime, the soap industry began to develop. The crowns of England and France granted the soap-making rights within their respective countries to certain individuals who returned the compliment by contributing a goodly sum each year to the Royal Treasury. But these high taxes imposed by the Crown made soap such a costly article that it remained a luxury available only to the richer classes. This caused great popular dissatisfaction, and eventually led to the soap industry being thrown open to anyone with sufficient enterprise and capital to start manufacture. Even then, however, soap remained scarce.

It was well nigh impossible to accumulate large quantities of fats and oils, or to manufacture commercial quantities of the necessary mineral ingredients. So the average man who wanted to remain socially popular continued to use snuffs and perfumes to make his presence agreeable to the smelling senses of his friends.

The first significant step in the popularization of soap was taken in France, in the latter part of the 18th Century. The Duke of Orleans, amazed at the toll of lives and suffering taken by death and disease in the filth-ridden slums of the city, offered an enormous reward to the chemist who would devise a method of producing lye, so essential in soap making, from common salt, of which France had a large supply. After many experiments, M. LeBlanc, the Duke's own personal physician, made the discovery. Soon afterwards the French Revolution broke out and LeBlanc died almost unknown and in poverty, but his great work was carried on by two other noted French chemists, Lavoisier and Chevreul. Additional discoveries made soap cheap enough that the benefits of its use came for the first time within reach of the average man.

Soap making in the American colonies, and up to recent years in many rural communities, was largely a household art. The most common practice was for the housewife to save her surplus animal fats and oils until spring, when they were boiled in a huge kettle and mixed with lye obtained from wood ashes. The formulae used were rule-of-thumb, more likely than not to produce soaps of widely varying quality and firmness. But the main purpose of these homemade soaps was to clean, and clean they did.

The business of manufacturing soap on a nationwide scale sprang up shortly after the Civil War. The era of industrial expansion following the War brought a demand for all sorts of soaps to be used in homes and factories. Also, housewives living in the rapidly growing urban districts were both unable and unwilling to continue making soap by the old method of boiling fats and lye in open kettles. But soap was a necessity, and, as a result, factories were erected to supply the demand.

Perhaps the most significant event in the soap industry since M. LeBlanc's discovery was the establishment of the meat packing business in the latter part of the 19th Century. It was the fortunate occurrence of these two events that finally brought the price of soap within the purchasing power of everyone. M. LeBlanc's discovery made an abundance of cheap minerals available, but it remained for the meat packing business to accumulate sufficient animal fats and oils to make large scale soap manufacture a reality. This is done by saving certain by-products known as inedible fats and oils which are produced in large quantities during the operations involved in meat preparation. Because of their chemical make-up, these fats and oils cannot be used in food products. They do, however, serve as an excellent base for the finest of soaps. Today, approximately 85 per cent of the total inedible fats and oils produced by meat packing plants goes into the manufacture of soap.

It is significant to note that the use of these inedible fats and oils for soap manufacture is of benefit both to the producer of livestock and to the consumer. Soap factories, some of them operated in connection with meat packing plants, offer a market for fats and oils which would otherwise be wasted or used in cheaper products. The soap market raises the value of these fats and oils and, in turn, increases the value of the livestock from which they are taken. Some idea of the important part that soap manufacturing plays in affording a market for the producer's livestock can be had from the total amount of animal fats and oils used by the soap industry. In 1936 the soap industry used approximately 759,000,000 pounds of fats and oils taken from cattle, swine, and sheep. This quantity amounted to more than one-half of the total fats and oils of all kinds used in making soap. It is clear that here is a valuable market for a part of the by-products taken from the producer's livestock. The benefit to consumers comes by way of cheaper meat food products as well as moderately-priced soaps.

Soap making today is a very interesting and scientific business. The raw materials used in making the scores of different kinds of soap, for as many different purposes, come from every corner of the globe. In addition to fats and oils that are by-products of the meat packing business, the soap industry uses cottonseed, olive, corn, coconut, peanut, linseed, palm, and other vegetable oils. Various combinations of these fats and oils are boiled or mixed with such minerals as potash, soda, and other chemical salts to form the many different kinds of soap.

Soap is manufactured in a variety of ways, depending upon the particular type of product desired. The most common method of manufacture is called the "full boiled" method, involving the use of large tanks or "kettles," some of which will accommodate as much as one-half million pounds of soap materials.

When the "full boiled" method is used, fats and oils are pumped into the kettle along with the proper amount of caustic soda solution. Heat is then applied by means of steam escaping through the holes of a perforated tube which lies at the bottom of the kettle. The heat generated in the solution causes saponification, a reaction in which the caustic ingredients work chemical changes on the fats and oils. When the fats and oils are completely saponified, common salt is added, causing the soap to rise to the top of the kettle while the lye settles to the bottom. The pure soap at the top of the kettle has a moisture content of about 30%, making it a thick fluid when hot and a solid when cold.

After the soap has been taken from the kettle it can be handled in many ways. In one common method the hot soap is pumped into a mixer called a "crutcher" where perfume and other materials are added, after which the soap is poured into a large box called a "frame" and allowed to cool. When the soap is cold, the sides of the frame are removed and the large block of soap is cut into bars of the proper size. These bars are then stamped and packaged for shipment.

Soap chips are made by running the hot kettle soap in a thin film over a chilled roll where it solidifies. The chilled soap is cut off the roll in ribbons which pass through a dryer, becoming soap chips.

Toilet soap is usually made by passing the dried soap chips through a series of milling machines which work perfume, coloring matter, and other materials into the product. After milling the chips are forced through a machine called a "plodder," which presses the soap into a large bar. This large bar is then cut into smaller pieces which are molded into final shape in a soap press.

Floating soaps are made by whipping a quantity of air into the soap in the "crutcher" operation. Tiny bubbles worked into the soap lower the specific gravity so that it becomes lighter than water and floats.

Liquid soap saponification is accomplished by the use of caustic potash instead of caustic soda. This process makes an unusually soft soap.

The great variety and high quality of products manufactured has made the soap industry a highly technical field. Each of the many varieties of soap is made to serve a particular purpose. Ingredients and chemical processes are carefully supervised by laboratory chemists and skilled workmen who check each "batch" many times during the process of manufacture. Every effort is made to produce the best possible product.

Because, as a people, we have never been forced to do without soap or to spend our lives accumulating various mixtures of dirt and perfume in the medieval manner, it is likely that few of us realize what an important part soap plays in our society. Someone has said, "The amount of soap a nation uses is a measure of its civilization." This statement is not without a good deal of truth. An adequate supply of soap available to every citizen works for better sanitation and better health on a national scale. These advantages are of inestimable benefit to all of us.

Swift & Company
Chicago

Agricultural Research Bulletin
No. 13
April, 1938

Cuts of Meat

(Can Be Read in 7 Minutes.)

Following the completion of our first two Meat Identification Contests for 4-H Club boys and girls, we printed Agricultural Research Bulletins Numbers 4 and 7. In these we reproduced the pictures of meat cuts which were shown in the contest folders. People interested in learning how to identify different cuts of meat sent us many requests for these bulletins.

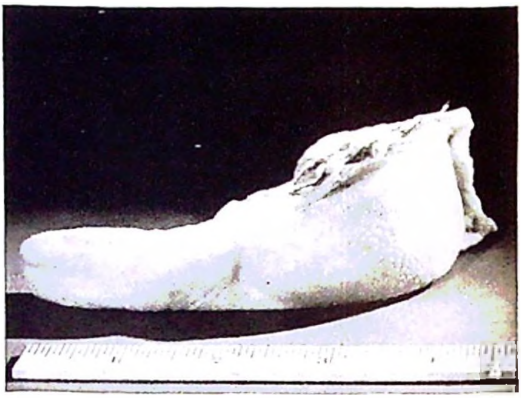
Our 4-H Club Meat Identification Contest for 1937 has just been concluded. The contest folder for this carried additional photographs of different retail cuts of beef, pork, lamb, and veal. A few illustrations of cooked meat dishes were included with the pictures of fresh meat cuts in this year's contest. These are reproduced herein. The names given the cuts of meat are those generally used in the Chicago area.

One part of the 1937 Contest for 4-H Club members involved the determination of the carcass yield for each kind of livestock. This was explained in the contest folder. Average live weights and dressing percentages of all cattle, calves, hogs, and lambs handled by Swift & Company for the fiscal year ending October 31, 1936 were given. From this the average number of pounds of carcass of each of the different kinds of livestock was to be determined. The problem merely involved multiplying the average live weight by the average dressing percentage in each case. This feature of the contest is reprinted on the last two pages of this bulletin. All of the figures relative to this problem are shown.

Lamb Rib Chops

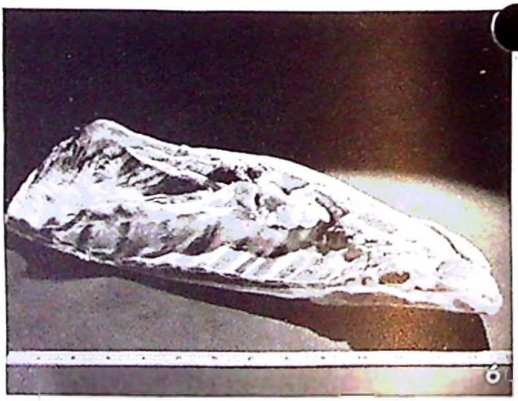
Pork Loin Roast (Center Cut)

Pork Lip

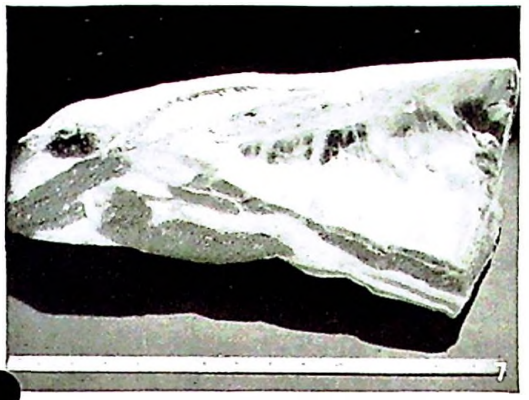


Lamb Tongue

Leg of Lamb

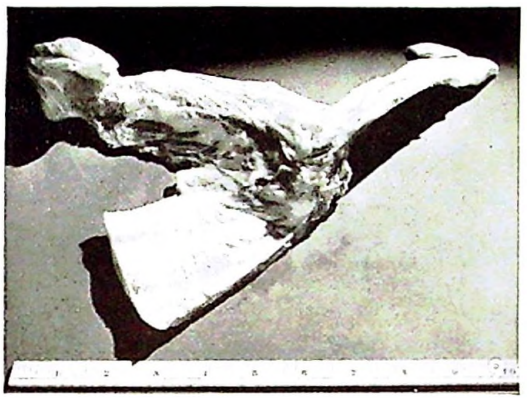


Veal Breast

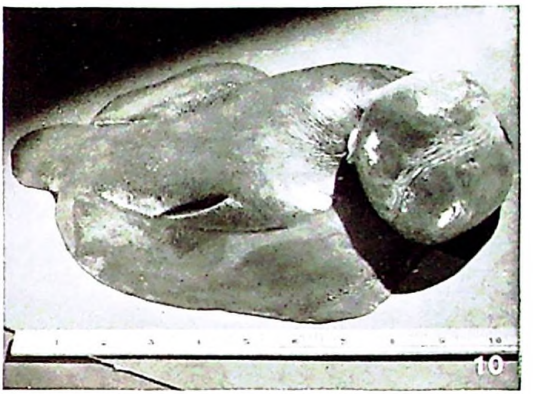


Beef Brisket (Bone-in)

Mock Duck (Lamb)

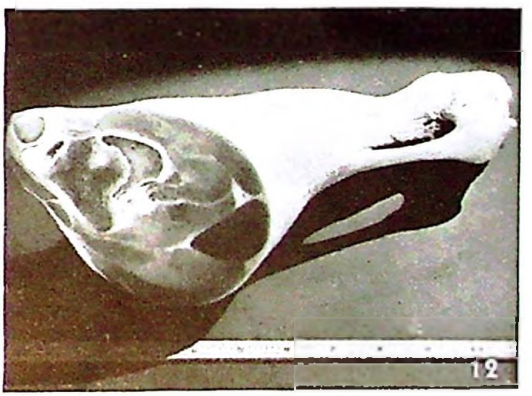


Neck Bones (Pork)

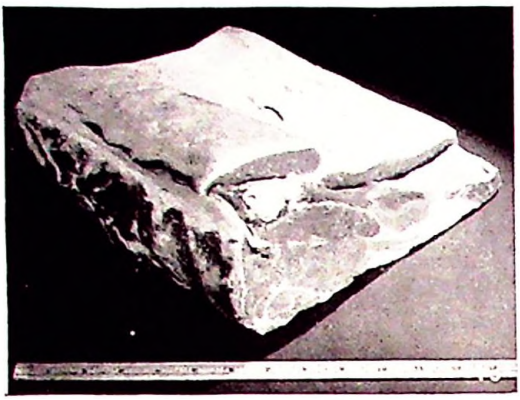


Pork Pluck

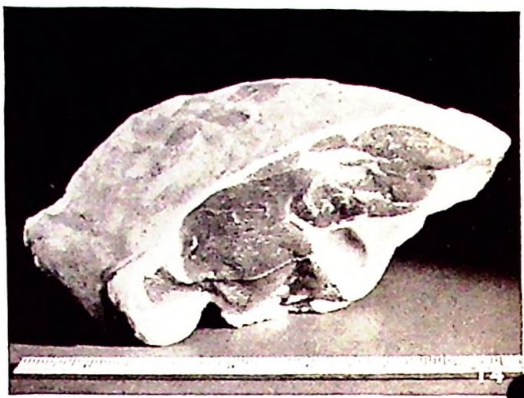
Beef Porterhouse Steak



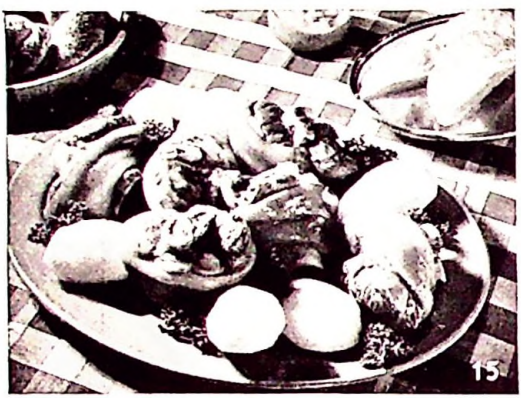
Hind Shank of Veal



Spencer Roll (Beef)

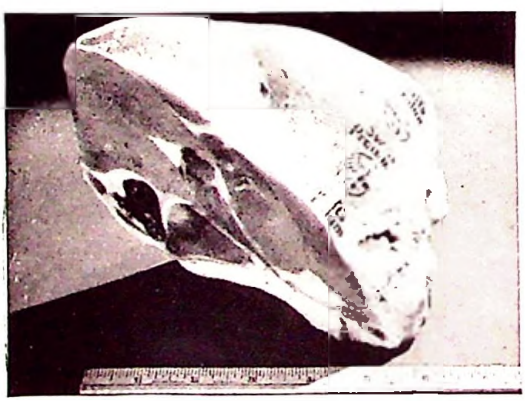


Lamb Loin End Roast or
Lamb Sirloin Roast

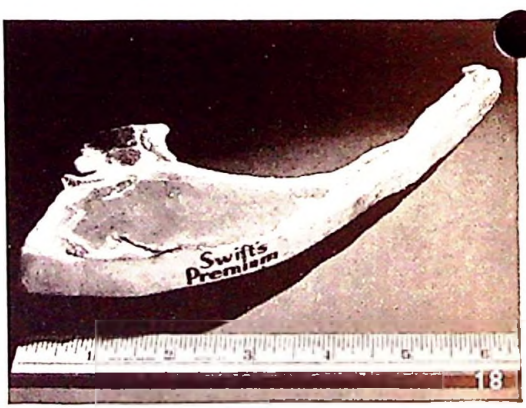


Pork Hocks

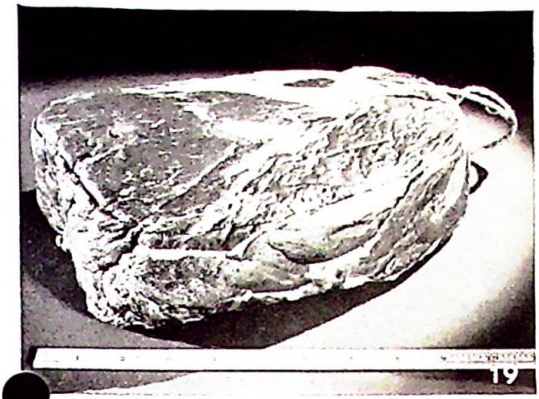
Rolled Rib of Beef



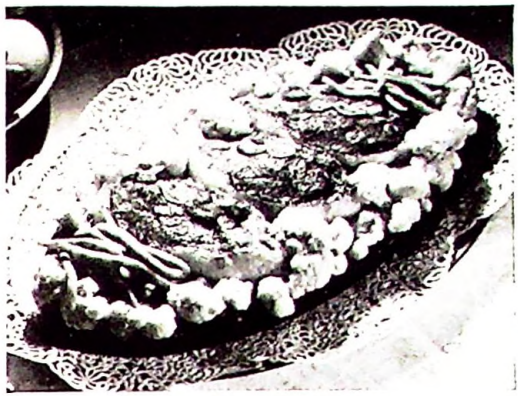
Veal Rump Roast



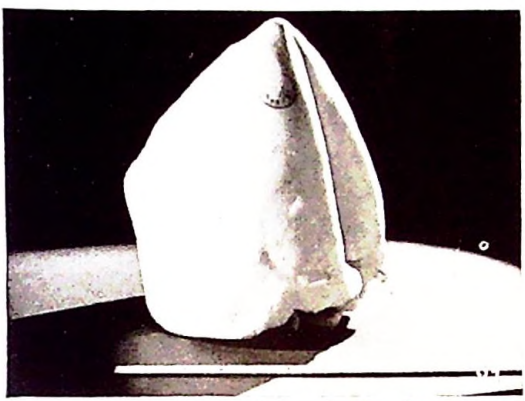
Veal Rib Chop



Dried Beef

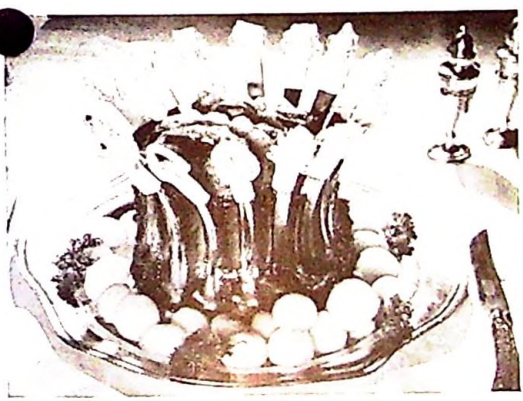


Lamb Leg Steaks

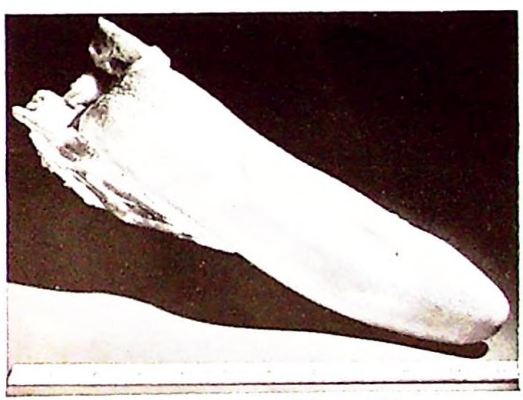


Cone Leaf Lard (Pork)

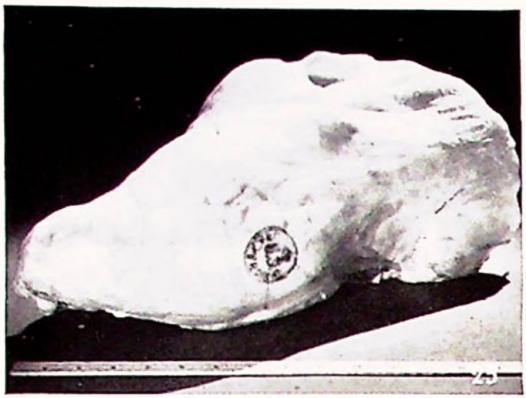
Veal Kidney Chop



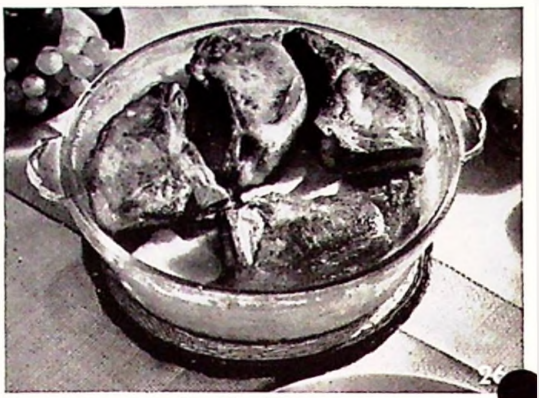
Crown Roast (Lamb)



Beef Tongue (Short Cut)

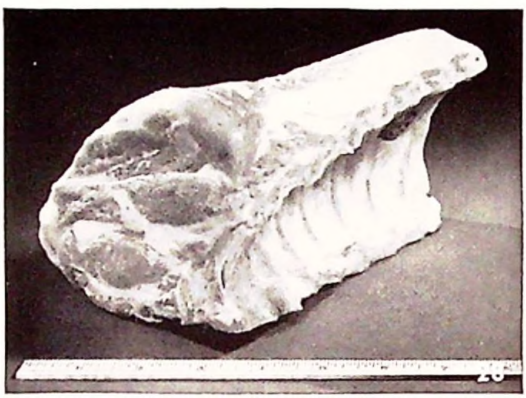


Beef Kidney Knob



Pork Chops

Pork Loin Roast (Ham End)



Pork Loin Roast (Shoulder End)

Lamb Rib Chop

Beef Short Ribs

Determination of the Carcass Yield for Each Kind of Livestock

In the meat packing business livestock is the principal "raw product." The meat packer buys cattle, calves, hogs, sheep, and lambs. From these animals he derives the finished food products. (Beef, veal, pork, lamb, mutton, prepared meats, and various by-products.)

One important point which the meat packer must watch closely is the amount of meat which is being derived from the various classes of livestock which his buyers have purchased. The amount of dressed weight an animal "yields," spoken of as dressing percentage, varies a great deal between the different classes of livestock and to an almost unbelievable extent between the different weights and grades of the same kinds of animals. For example, the meat packer might buy a steer weighing 1,000 pounds for $12.00 per hundred pounds, or $120.00. If this is a real good steer, it may dress or yield 60 per cent, which would give 600 pounds of dressed weight when the animal heat is out of it. Thus, the sale price of the meat would have to be about $20.00 per hundred pounds in order to return the $120.00 purchase price of the live steer.

However, things do not work out just this way. The animal produces some additional products of value in the form of edible and inedible by-products, for which no credit has been allowed. But we have to take into account also the expenses which must be allowed for, such as labor, supplies, dressing operations, handling of by-products, steam power, refrigeration, depreciation on all buildings and equipment, repairs, taxes, freight, sales costs, administrative expense, etc.

During normal times the cattle and sheep by-product values will as a general rule be roughly sufficient to offset

the meat packer's expenses, thus leaving the meat to return enough to cover the purchase price of the live animal. By-product values vary from time to time just as do the values of meat and live animals, so this condition is not always true.

In the case of hogs, the dressing percentage is larger, but the value of by-products is very much lower in relation to the value of the carcass than is the case with cattle, calves, or lambs.

Since we are primarily interested in meat, let us outline a little problem to determine the carcass yield of different classes of livestock. In the table below are listed the average weights of cattle, calves, hogs, and lambs slaughtered by Swift & Company for the fiscal year ending October 30, 1937. (In the contest 1936 figures were shown as they were the latest available when the contest was announced.) The average dressing percentage of each of these different classes of livestock is also shown. This dressing percentage (dressed meat yield per 100 pounds live weight) represents the chilled weight of the dressed carcass but does not include the weight of by-products. For this problem by-products were disregarded, and contestants were asked to determine how much carcass meat is available from each of the average weights of animals listed below.

Kind of Livestock	*Average Live Weight*	*Average Dressing Percentage*	*Average Number of Pounds of Carcass**
Cattle	896 lbs.	51.96	466
Calves	182 "	62.10	113
Hogs	215 "	73.77	159
Lambs	84 "	46.96	39

*These figures represent the regular form in which meat is sold wholesale. They include both meat and bone.

Additional copies of this bulletin are available upon request.

Printed in U.S.A. 31126D

Swift & Company
Chicago

Agricultural Research Bulletin No. 14
October, 1938

Hog Production

and Pork Consumption in the United States

(Can be read in 7¾ minutes)

THIS bulletin discusses hog production and pork consumption in the United States. It is an answer to many requests received from students and teachers for information on that subject.

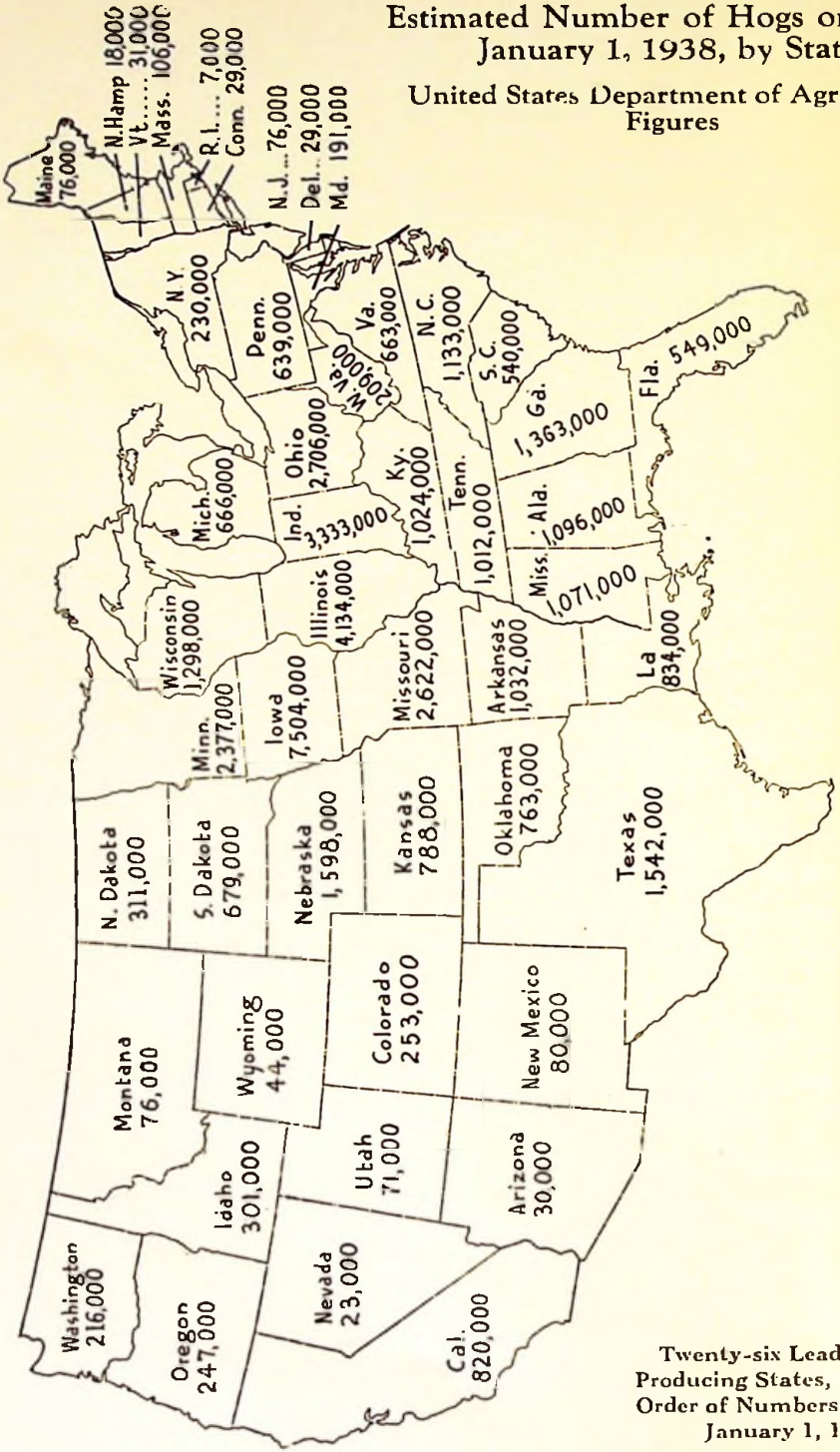
Hog production on the North American continent began with the early explorers and colonists. The Spanish explorer, DeSoto, brought hogs into Florida in 1538 and a few years later other shipments were brought into Newfoundland, Nova Scotia, and the colonies along the Atlantic Coast. From that beginning hog production has grown steadily until today it is one of the most important divisions of the livestock and meat industry. On January 1, 1923, a record year, 69,304,000 hogs were on farms and ranches in the United States. The hog population fell to 39,004,000 in 1935 but is now working upward again, the United States Department of Agriculture's estimate showing 44,418,000 hogs on farms on January 1, 1938. Out of the nation's total of nearly seven million farms, 4 million raise hogs.

Hogs are raised in every state of the United States. The number of hogs on farms in each state on January 1, 1938, and the rank of the 26 leading states in hog production, is shown on the map of the United States which appears on Page 2 of this bulletin.

The numbers of hogs produced in the different geographical sections of the United States vary. The production of hogs is

Estimated Number of Hogs on Farms January 1, 1938, by States

United States Department of Agriculture Figures



Twenty-six Leading Hog Producing States, Ranked in Order of Numbers on Farms January 1, 1938.

1. Iowa
2. Illinois
3. Indiana
4. Ohio
5. Missouri
6. Minnesota
7. Nebraska
8. Texas
9. Georgia
10. Wisconsin
11. N. Carolina
12. Alabama
13. Mississippi
14. Arkansas
15. Kentucky
16. Tennessee
17. Louisiana
18. California
19. Kansas
20. Oklahoma
21. S. Dakota
22. Michigan
23. Virginia
24. Pennsylvania
25. Florida
26. S. Carolina

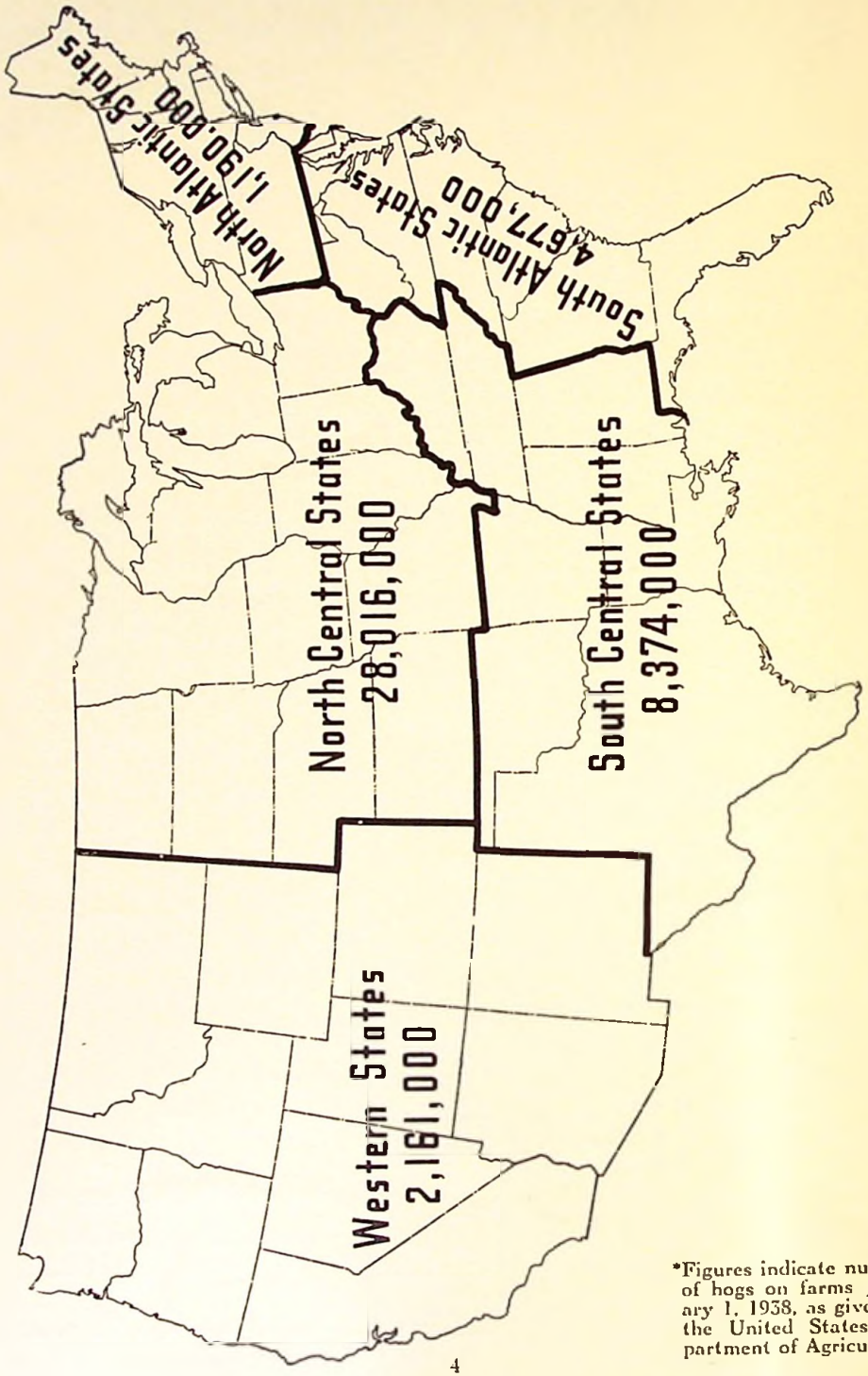
largest in the North Central and South Central sections where general farming operations are carried on. These sections raise large quantities of corn, a grain which is a very important feed for hogs. The numbers on farms in each section on January 1, 1938, are shown on the map on Page 4.

This map clearly shows the importance of the North Central states as a hog-producing area. Two centuries ago most of the hog production and the majority of the people were located on the eastern seaboard where pork not consumed at home was prepared in barrels of brine for trade with the West Indies. As the first settlers moved westward into the Ohio Valley to begin farming and livestock raising there, hog production began to move westward also. The east-to-west movement of hog production is still in effect; however, the greatest concentration in production is in the "Corn Belt" of the North Central States. Iowa became the leading hog-producing state in 1880 and has always ranked first since that date.

Hog production and corn production usually go hand in hand. As rapidly as the pioneers opened up new corn lands, they increased the size of their hog herds. The best way to market corn was by feeding it to hogs and selling the hogs when they were fat. As one writer of early days put it, the system was to "pack 15 bushels of corn into a pig, pack the pig (pork) into a barrel, and ship the barrel to the eastern seaboard." From those days to this, hog production has been one of the most important phases of the livestock and meat industry, and corn has been the principal feed used in fattening hogs.

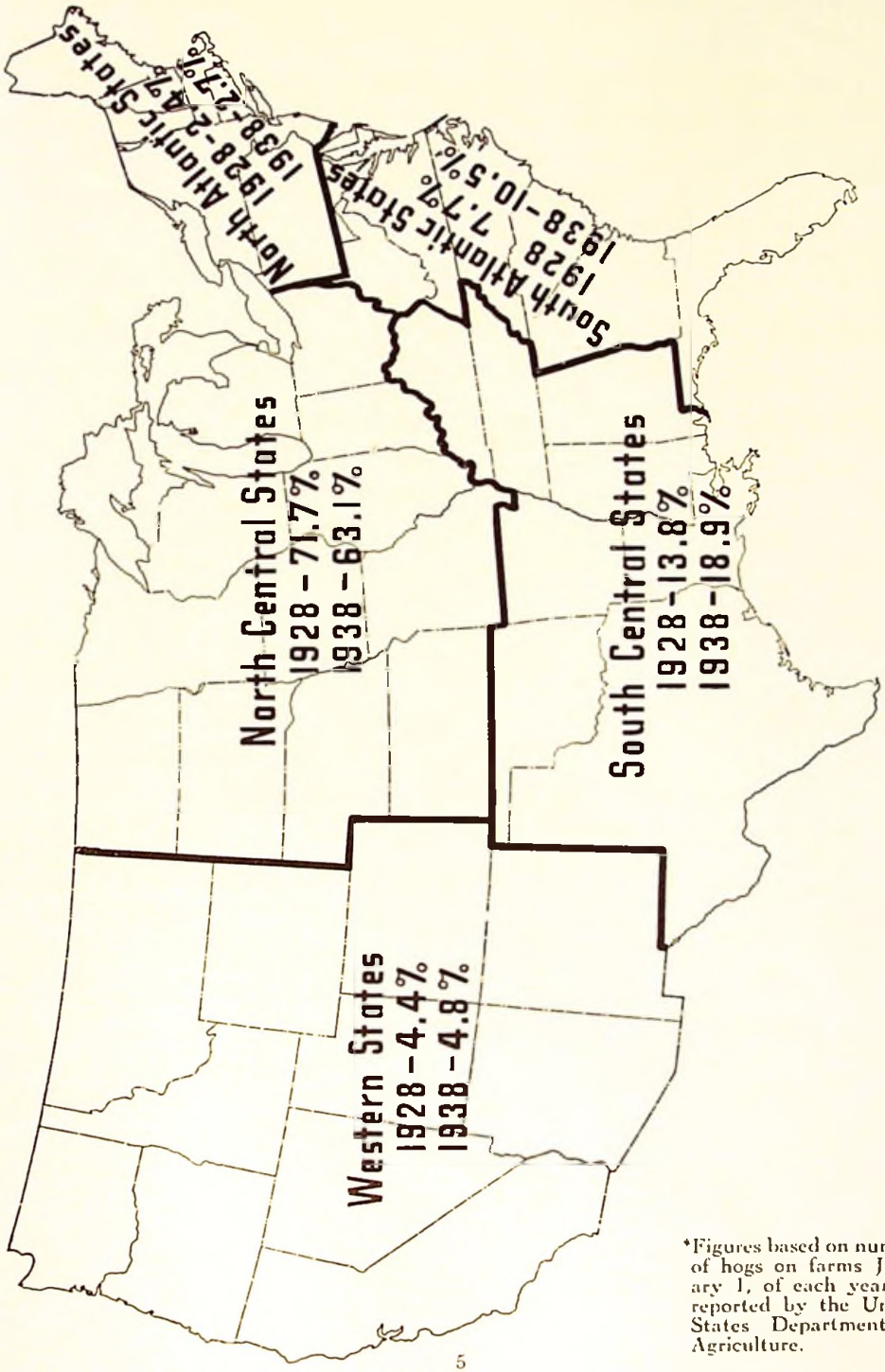
In recent years there has been a change in the per cent of the nation's total hog population that each state and section has on its farms and ranches. In other words, some states and sections have increased their share of the nation's total hog population and thus have become relatively more important hog producers,

Number of Hogs by Geographical Sections of the United States*



*Figures indicate number of hogs on farms January 1, 1938, as given by the United States Department of Agriculture.

Percentage of Total Number of Hogs in the United States
in Different Geographical Sections.
(Percentage compared for 1928 and 1938.)*



*Figures based on number of hogs on farms January 1, of each year, as reported by the United States Department of Agriculture.

while other states and sections have decreased their share of the nation's total hog population and have thus become relatively less important as hog producers. These changes in the percentages have been greatest in the North Central and South Central States. From 1928 to 1938 the percent of the nation's total hog population raised in the North Central States decreased from 71.7 per cent to 63.1 per cent, while the percent raised in the South Central States increased from 13.8 per cent to 18.9 per cent. Figures for all sections are shown on the map which appears on Page 5.

The decrease in the percentages of hogs produced in the North Central and the increase in the South Central and South Atlantic States during the last few years is probably the result of many influences. During several years severe drouths struck most of the North Central States, reducing the amount of corn and other feed grains that could be used for hog feed. Production control measures also had an effect.

During what have been considered normal years of hog production, the greater part of the hogs produced in the United States have been raised west of the Mississippi River. Farmers and livestock producers there normally raise great quantities of corn and market a considerable part of the crop in the form of pork. On January 1, of 1934, the states west of the Mississippi River had 58 per cent of the nation's total hog population. However, by January, 1 1938, the number of hogs in these states had declined to approximately 50 per cent of the total United States hog population. Drouths, which caused a shortage of corn, together with production control reduced hog production in those states.

Hogs are marketed at many central livestock markets. These are located in all sections of the United States, but the largest numbers are sent to markets located in and near the areas of heavy production. The map on Page 7 shows the location of the twenty most important hog markets during 1937. The six highest ranking hog

Twenty Public Stock Yards Receiving Largest Number of Hogs During 1937

markets received slightly over 50 per cent of the total receipts at the 68 markets licensed by the United States Department of Agriculture in 1937. The five leading markets in the order of their importance are Chicago, Ill.; East St. Louis, Ill.; South St. Paul, Minn.; Indianapolis, Ind.; and Omaha, Nebr.

All of the important hog markets receive hogs every week and month of the year. However, the total number of hogs coming to all of these markets during the different months and seasons of the year varies considerably. For instance, the total number of hogs received at all markets during the late fall and early winter months is usually larger than the number received during any other months of the year. Note the table below, giving the per cent of the year's total hog marketings which were received at 68 of the public stock yards during each month of the year. These figures are given for 1925 and 1937.

Month	Percentage of Year's Total Hog Receipts Received Each Month at 68 Public Markets	
	1925	1937
January	13.9	11.0
February	10.4	9.2
March	8.0	9.8
April	7.4	9.0
May	7.5	6.7
June	8.0	6.7
July	6.4	5.1
August	5.8	5.6
September	6.2	6.8
October	7.7	8.4
November	8.7	10.3
December	10.9	11.4
	100.0	100.0

Heavy marketing of hogs during the fall and winter months and light marketing during the spring and summer months creates one of the livestock and meat industry's many problems. Such seasonally uneven marketing tends to unbalance the supply of hogs and the demand for pork. During the months when marketing is heaviest, the total amount of pork products prepared in meat packing plants is larger than the amount necessary to supply normal consumer demands. But when marketing is smallest, the amount of pork prepared is too small to satisfy normal consumer demands. This is one cause of seasonal variations in pork prices and consequently affects the price the producer receives for his hogs.

Unlike hog production, the consumption of pork is greatest in the states east of the Mississippi River. Figured on the basis of distribution of population, the states east of the Mississippi River eat approximately 70 per cent of the nation's pork every year. These are the states which had only 42 per cent of the total hog population on January 1 of 1934. The west-of-the-river states, which had 58 per cent of the total hog population of January 1, 1934, consume only 30 per cent of the pork eaten in the United States. From this the student of the livestock and meat industry can see that the task of marketing livestock and meats involves the job of moving hogs and pork hundreds of miles from the main producing areas to the large consuming areas.

Figures released by the United States Department of Agriculture giving the estimated production of meat and lard in the United States not only tell an interesting story but clearly show the prominence of pork in the American diet. These estimates include meat dressed on farms and by local retailers as well as meat from commercial plants.

Government figures disclose that for the 28-year period from 1910 to 1937 inclusive, the pounds of pork produced (including lard) exceeded beef production each year. Pork is compared with

beef here as beef is the only other meat that approaches pork in volume.

Pork production (including lard) represented a greater volume of meat than the total production of all beef, veal, lamb, and mutton in 23 different years since 1910. Normal pork production (including lard) has been well over 10,000,000,000 pounds annually until 1935, when a combination of drouth and the government reduction program greatly reduced hog numbers. The government reported pork production (including lard) for 1937 as 8,320,000,000 pounds which is somewhat below normal yet considerably above the low point of 1935 when pork and lard production was reported as 7,220,000,000 pounds.

Swift & Company
Chicago

Agricultural Research Bulletin
No. 15
May, 1939

Cattle Production

and Beef Consumption in the United States*

(Can be read in 15 minutes)

CATTLE were brought into what is now the United States in two separate movements, one coming through the eastern seaboard colonies early in the seventeenth century and the other across the border from Mexico two hundred years later. Although entirely separate, both these movements have played an important part in the economics and the drama of the American cattle industry.

The first cattle brought to the eastern colonies are reported to have reached Jamestown in 1611, and were followed soon afterward by small herds landed at Plymouth and the other colonies. These cattle were almost sacred during the first few years when herds were being built up to the point where they would furnish a steady supply of meat and milk. Colonial laws prohibited slaughter and a single cow was often so valuable that ownership was split into shares held by several persons.

After a few years of herd development, cattle became one of the mainstays of colonial life. Each village had a sizable herd upon which it depended for milk, beef, and hides, and, to some extent, power for farm implements in the field. To protect the cattle against the raids of unfriendly Indians, they were grazed in large herds during the daytime and brought back into the village at nightfall.

According to some historians, it was the need for newer and larger cattle pastures that constantly forced the migration of the pioneers farther inland. Later on, however, early settlers pushing through the Cumberland Gap in search of new land shortly after

*Agricultural Research Bulletin No. 14 discusses hog production and pork consumption in the U. S. This bulletin gives similar information about cattle production and beef consumption.

the Revolutionary War found rich farming lands, but no markets for the crops they grew. The solution was more livestock which could be fattened and then driven to livestock markets in the large cities to the east. This was the beginning of a westward movement that continued until the descendants of the first colonial cattle had spread into every state of the Union.

The movement of cattle across the border from what is now Mexico into the western plains and mountain country began about 1800. These cattle were the famous "longhorns"—wild, gaunt, and exceedingly hardy animals descended from Spanish cattle brought to the West Indies by the early Spanish explorers. In the early west the "longhorns" multiplied rapidly, reaching their peak when new grazing lands were opened up by wholesale slaughter of the huge "southern herd" of buffalo in the 70's. Often worthless, except for their hides (there being no railroads or meat packing plants in the early West), these "longhorns" were frequently driven in herds of thousands over famous trails, many hundreds of miles long, leading from one grazing section to another. Around these "drives" center many of the most romantic incidents of American history. But the historical records are all that remain today. The trails are gone and the "longhorn" has given way to cattle of superior breeding. A few descendants of the early "longhorns" may be found in the Southwest where they are kept as curiosities, principally for exhibition purposes in connection with rodeos and livestock shows. The federal government has made plans to continue a herd of "longhorns" on the Wichita National Forest in western Oklahoma as buffalo herds are maintained in certain national parks so that these animals will not become extinct.

By 1870, cattle were being produced quite generally throughout the United States. It has been principally since 1870, however, that the Western range section and our North Central section have developed into the important producing areas which they represent today. Prior to this time the states east of the Mississippi River were producing the greater percentage of the country's cattle.

Beef cattle will always be produced most extensively in areas where an abundance of feeds can be raised the cheapest, and where large areas of pasture land are available. It is for these reasons

that the North Central and Western range areas have developed into the important cattle-producing sections of today. The great ranges of the western United States provide excellent pasture for cattle. In certain fertile valleys throughout this area, sugar beets, alfalfa, and some feed grains are produced, thus permitting the feeding and fattening of some cattle. However, most of the cattle from the western country are moved to feed lots of the North Central area to be finished or fattened for market. It is in the North Central area that the great abundance of feed grains and forage crops are produced. As these areas became prominent for cattle production, our northeastern states rapidly declined in importance in respect to cattle. This, however, is certainly no reflection on our northeastern states. Even though they could not produce feed for livestock as economically as it could be produced in some other areas, much of their land was found to be of more value for other purposes. Cultivated land near large metropolitan areas will yield larger returns when devoted to fruits and vegetables, commercial poultry farms, or dairying. Rolling land not suitable for cultivation is still used as pasture land for cattle in this northeastern area. In more recent years dairy cattle have replaced beef cattle to a very great extent in this section.

At this point a word of explanation relative to beef cattle and dairy cattle might be appropriate. This bulletin is intended to be of a general nature, touching upon the cattle and beef production of the United States. In more recent years dairy cattle have increased more rapidly than cattle intended primarily for beef. Through the years it is noticeable that the number of dairy cattle has tended to follow a long-time upward trend, much the same as human population has grown. There is practically no evidence of cyclical movements in dairy cattle numbers such as we have in beef cattle. With beef cattle it is evident that now and then a year of peak production is reached which is followed by several years of declining numbers, then several more years of increasing numbers until a new peak is reached and another of these cycles occur. This cyclical movement with beef cattle covers periods of from 14 to 18 years, that is, from one point of high production to another usually this number of years will have elapsed. Similarly, it is approximately 14 to 18 years, on the average, between the low points in beef cattle production.

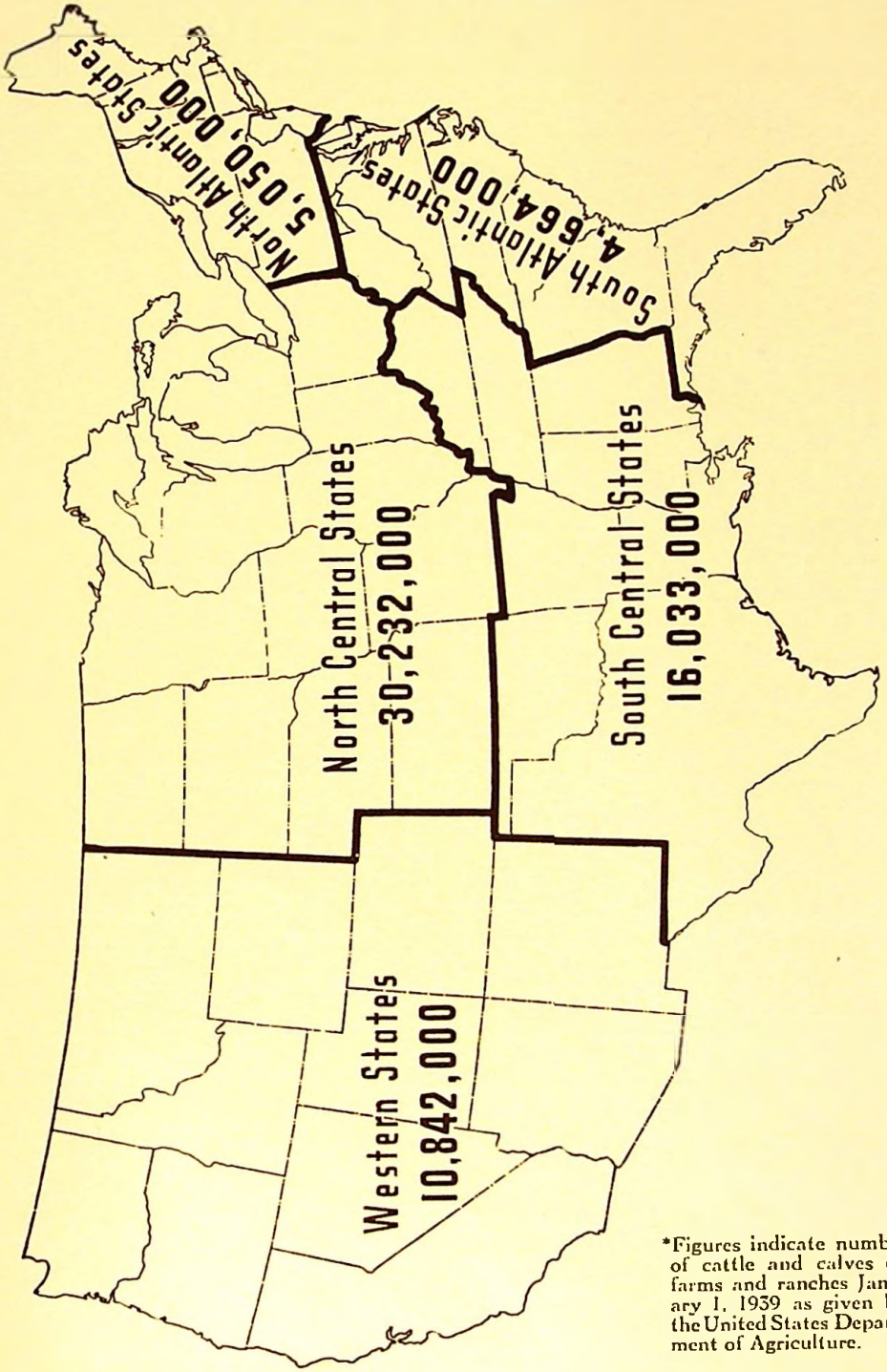
Estimated Number of Cattle and Calves on Farms and Ranches, January 1, 1939

United States Department of Agriculture Figures

Twenty-four Leading Cattle Producing States, Ranked in the Order of Numbers on Farms and Ranches, January 1, 1939.

1. Texas
2. Iowa
3. Minnesota
4. Wisconsin
5. Nebraska
6. Kansas
7. Illinois
8. Missouri
9. California
10. Oklahoma
11. New York
12. Ohio
13. Michigan
14. Indiana
15. South Dakota
16. Pennsylvania
17. Colorado
18. Mississippi
19. North Dakota
20. Kentucky
21. New Mexico
22. Tennessee
23. Arkansas
24. Louisiana

Number of Cattle and Calves by Geographical Sections of the United States*



*Figures indicate number of cattle and calves on farms and ranches January 1, 1939 as given by the United States Department of Agriculture.

Today about 40 per cent of all cattle in this country are classified as dairy cattle. Since dairy cattle numbers have tended to increase quite steadily, it is apparent that in a study of all cattle in this country, the changes in numbers from year to year will be due principally to changes in beef cattle numbers, particularly when decreases occur.

In this bulletin all figures used are for all cattle, that is, combining beef cattle and dairy cattle numbers. This is done largely because of the difficulty of accurately separating the two.

The number of cattle on farms and ranches in each state on January 1, 1939, and the rank of the 24 leading states in cattle production, is shown on the map of the United States which appears on Page 4 of this bulletin.

Texas has been the top-ranking cattle-producing state continuously since 1867 when the United States Department of Agriculture first made estimates of the numbers of livestock on farms and ranches by states. Iowa has ranked second in cattle numbers continuously since 1881. It is interesting to note that from 1867 to 1880, inclusive, New York ranked second in cattle production. Texas reached the peak of its cattle production in 1891, Iowa in 1903. However, it appears to be very likely that these two states will continue to rank first and second in cattle production for many years to come because of the great lead they still hold over all other states.

To some it may appear, after studying the map on Page 4, that Texas is far ahead of Iowa in cattle production; however, it is difficult to compare these two states from the standpoint of numbers of cattle alone. The value per head of cattle in Iowa is considerably greater than in Texas. Thus, even though Texas produces greater numbers of cattle, Iowa often has cattle of a greater total value than those of Texas, according to figures released by the Bureau of Agricultural Economics.

Cattle production in certain sections of the United States was referred to previously. The map on Page 6 shows the number of cattle on farms and ranches on January 1, 1939 by geographical sections. This clearly shows the importance of the North Central section as a cattle-producing area.

The following tables point out how cattle production by geographical sections has varied over a period of years. Figures are

also given to show the total cattle population of the United States for these same years.

Cattle Numbers in the United States for Certain Years by Geographical Divisions*

Section	1880	1890	1920	1934	1939
North Atlantic	6,500,000	6,142,000	5,190,000	4,879,000	5,050,000
North Central	15,908,000	24,828,000	31,111,000	34,039,000	30,232,000
South Atlantic	4,085,000	4,089,000	4,943,000	4,732,000	4,664,000
South Central	11,401,000	15,919,000	16,446,000	18,341,000	16,033,000
Western	5,453,000	9,036,000	12,710,000	12,271,000	10,842,000
Total U. S.	43,347,000	60,014,000	70,400,000	74,262,000	66,821,000

Percentage of the United States, Total Cattle Production in Different Geographical Areas for Certain Years*

Section	1870	1880	1890	1920	1934	1939
North Atlantic	18.9	14.9	10.3	7.4	6.6	7.6
North Central	32.3	36.7	41.4	44.2	45.8	45.3
South Atlantic	11.2	9.4	6.8	7.0	6.4	6.9
South Central	28.7	26.3	26.5	23.3	24.7	23.9
Western	8.9	12.7	15.0	18.1	16.5	16.3

*Figures from Bureau of Agricultural Economics.

Figures are given for 1934 because on January 1 of that year an all-time high in cattle numbers was reached. To many, 1934 is regarded as our most recent year of normal cattle production. Severe drouths occurred in several sections of the United States during the summers of 1934 and 1936. These resulted in quite heavy liquidation of cattle in the areas where feed and water were scarce. The North Central and Western sections suffered the greatest losses during these periods which accounts principally for their decline in numbers of cattle from 1934 to 1939. Several years are required to rebuild cattle herds following such a disaster, not only because the cattle population increases slowly, but also because time has to be allowed for ranges to be restored.

These tables show that cattle numbers have declined quite steadily in the North Atlantic area. Most of the states in this area reached the peak of their cattle production by 1880; all of them by 1890; and one of them as early as 1869.

Cattle numbers in the North Central area have increased steadily for many years. Today there are more cattle in this area than in the next two ranking areas combined.

Twenty Public Stock Yards Receiving Largest Number of Cattle During 1938

The South Atlantic section has also declined in importance as a cattle area in more recent years. However, the number of head has remained approximately the same for the last 60 years.

There has been little change in the percentage of this country's cattle which have come from the South Central section throughout the years that records have been kept. This area has produced about one-fourth of all our cattle for many years.

The Western area seems to have reached its peak in cattle production about 1920. Since that year cattle numbers have been declining in all but four of the Western states. Two of these states have had a cattle decrease of about 50 per cent in the last 20 years.

Regardless of where cattle are produced, they must be marketed, processed to obtain meat and by-products, and these products distributed among consumers who can and will use them, thus creating value for cattle.

Cattle are marketed, for the most part at 67 central markets located in various sections throughout the United States. The largest numbers of cattle are marketed in and near the areas of heavy production. The 20 leading cattle markets in 1938 are shown on Page 8. A total of 14,075,548 cattle were received at the 67 public markets during 1938, according to the Bureau of Agricultural Economics, yet about 50 per cent of these cattle were received at the six leading cattle markets. The six top-ranking cattle markets in the order of their importance for 1938 were Chicago, Ill.; Kansas City, Mo.; South Omaha, Nebr.; South St. Paul, Minn.; East St. Louis, Ill.; and Fort Worth, Tex.

Cattle receipts at the public markets vary from day to day, week to week, and month to month. A study of the monthly receipts of cattle at all public markets combined shows that October is the month of greatest receipts almost without exception. Cattle receipts begin to go up in August, reach the peak in October, and still hold up well throughout November. As a rule, about 40 per cent of the year's supply of cattle is marketed during the four months of August, September, October, and November. February is usually the month of lightest cattle receipts, although May or June is occasionally the lightest month. Note the table which follows, giving the percentage of the year's total cattle marketings which were received at the 67 public stock yards each month during the years 1925 and 1938.

Month	Percentage of Year's Total Cattle Receipts Received Each Month at 67 Public Markets	
	1925	1938
January	7.9	8.2
February	6.2	6.3
March	7.4	7.8
April	7.0	6.9
May	6.7	8.0
June	6.8	7.7
July	8.2	8.0
August	9.5	9.6
September	9.3	10.0
October	12.4	11.2
November	10.0	9.2
December	8.6	7.1
	100.0	100.0

This irregular marketing of cattle means that the meat packer can never tell very far ahead what the possible supply of cattle will be. Since the beef business in this country is principally a fresh meat business, the meat packers are called upon at certain periods to move much larger supplies of beef than at other periods during each year. The general public believes that beef is frozen and then sold when the price is favorable. This is not true. Frozen beef is not acceptable to retailers and consumers unless it can be bought for from three to four cents per pound less than fresh beef of a comparable grade. No meat packer could afford to buy cattle, stand the cost of freezing the beef from these cattle, the expense of maintaining huge freezer accommodations for the beef, and take the much lower price for his frozen beef. Such a practice would consistently result in unprofitable operations in this country. During a period of five recent years only 1.9 per cent of all beef produced was frozen. Most of this beef was for use in sausage and other prepared meats and frozen during a period of plentiful supply to be carried over for later use when such grades of beef are not available to a sufficient extent.

Fresh beef is perishable and can be carried only a short time even under refrigeration. Thus the practice of most meat packers is to sell beef as quickly as possible. As a rule, beef is thoroughly chilled and ready for shipment within two days after cattle are slaughtered. About four or five days are required on the average to move beef from the packing plants to points where the beef is sold. A few additional days will be needed to sell the beef to retailers. Beef is generally sold within from 10 to 12 days after cattle are slaughtered. The only way that large supplies of beef can be moved into consumption is by lowering the price of beef sufficiently to attract additional customers and in this way provide a market for the available supply.

It has been pointed out that the main cattle producing regions of this country are in the central and western regions. It is also of interest to note that over 70 per cent of all beef cattle in this country are in states west of the Mississippi River. Seven of the nine top-ranking cattle markets are located west of the Mississippi River; one of these—East St. Louis—is located just across this River, and the other—Chicago—is within 200 miles of the Mississippi.

About 70 per cent of all cattle slaughtered under federal inspection come from packing plants which are located in the North Central states. Thus it will be seen that most of the production, marketing, and processing of cattle takes place in the North Central section of the country. The southwestern and far western states are also important in these respects.

To complete our picture of cattle and beef, we must give some attention to the consumption of beef. When we come to a consideration of beef consumption, we have to concentrate our attention largely upon the eastern part of the United States. About 70 per cent of all the people in this country live east of the Mississippi River. The greatest concentration of population is in the extreme northeastern section. Any food product must move to the places where there are people to utilize it. Thus it is necessary to move beef from the surplus-producing regions of the West to the deficit-producing areas of the East. This matching of supply and demand presents the meat packer with one of his major problems, as it requires that the average pound of beef be moved about 1,000 miles from where it is produced to where it is consumed.

Beef is one of the most important food products in the American diet. The United States Department of Agriculture estimates the production of beef for 1937 as 6,759,000,000 pounds. This figure is about one billion pounds less than that for 1918 which was our record year for beef production.

Government figures give the per capita consumption of beef for 1937 as 54.3 pounds. Per capita beef consumption in this country has varied from a high of 74.1 pounds in 1909 to a low of 46.3 pounds in 1932. The average consumption of beef per person per year from 1900 to 1937 inclusive, was 61.2 pounds.

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Packer Profits

(Can be read in 15 minutes)

WE want the public, especially the livestock producer and consumer of meat, to know more about the basic facts of the meat-packing business. Meat-packer profits is one of the much discussed subjects. This bulletin deals with that subject.

With human nature as it is, the consumer of meats is tempted to blame the packer whenever meat prices are high. High meat prices seem to suggest that the packer is making excessive profits. On the other hand, when livestock prices are low, the producer of livestock is inclined to blame the packer. He is likely to think that high packer profits are the cause of low livestock prices.

The truth of the matter is that the profits of the packer are too small to have any appreciable effect upon the price of livestock or the price of meat products. Take, for example, Swift & Company's profits in 1937*: profits for the year amounted to $8,849,000, and sales amounted to approximately $885,837,000. Through the simple operation of dividing the yearly sales into the total profit, one will find that the company made an average profit of approximately one cent on each dollar of sales. Expressed in other terms, the average profit amounted to 1/7 of a cent a pound. A small profit is possible because Swift & Company handles about 6,500,000,000 pounds annually. It is evident that this small profit, or even a considerably larger one, could have no appreciable effect on the price of livestock or on the price of meat.

* Figures for 1938 not used because a loss of $3,305,593.45 occurred in that year.

If Swift & Company remitted its entire profit to consumers, they would be able to buy $5.00 worth of meat for $4.95. If the company remitted its entire profit to the producer of livestock, it would increase the farmer's income but little; he would get a total of about $1.50 more for a 1,000-pound steer.

The figures quoted on profits for 1937 are a little less than other years. A summary of Swift & Company's financial statements shows earnings during the past 39 years of 1 and 3/5 cents per dollar of sales.

The foregoing discussion of earnings has related to Swift & Company. Some space will now be devoted to meat-packing concerns as a whole. Figures on profits in the meat-packing business are issued yearly by the United States Department of Agriculture, and here is what they show:

Net Worth, Sales, and Profits of Companies Conducting Slaughtering Operations, as Reported to U. S. Department of Agriculture

(Figures on net worth, sales, and profits are in thousands of dollars; that is, 000 omitted)

Year	Number of Cos. Reporting	Net Worth	Sales	Profits	Per Cent Return on Net Worth	Return in Cents per Dollar of Sales
1925	339	$823,714	$3,464,982	$46,611	5.66	1.35
1926	383	840,474	3,402,992	42,867	5.10	1.26
1927	406	827,945	3,490,907	18,795	2.26	.54
1928	467	829,632	3,665,868	48,175	5.81	1.32
1929	587	855,415	3,848,119	39,906	4.66	1.04
1930	686	887,119	3,627,783	32,463	3.66	.90
1931	670	835,362	2,770,048	(17,954)*	(2.14)*	(.65)*
1932	626	781,036	1,960,564	(6,457)*	(.83)*	(.33)*
1933	629	765,712	1,867,461	26,392	3.44	1.41
1934	608	726,038	2,284,978	36,054	4.97	1.58
1935	614	697,352	2,784,939	37,376	5.35	1.34
1936	589	708,249	3,021,293	32,929	4.65	1.09
1937	585	712,489	3,297,503	21,776	3.06	.66
Avg.	...	791,580	3,037,495	27,610	3.49	.91

( )*—Loss.

These figures include earnings from all sources (many packers handle not only meat, but also poultry, butter, eggs, shortening, and

various other products and by-products). If gains from meat-packing operations alone were included, the profit totals would be still smaller.

The meat-packing business is the largest business in the United States, when measured by the volume of sales, which averages many hundred million dollars annually. The investment by shareholders runs into millions of dollars. Nevertheless, compared with other businesses, the profits earned are exceedingly small.

The average profit of all manufacturing industries during the ten-year period ending in 1931, as shown by statistics of income tax returns, was nearly 5 cents per dollar of sales, as compared with an average profit of less than one cent per dollar of sales for the meat-packing concerns.

The accompanying tables give more detailed information:

Percentage of Net Profits to Sales of Corporations

Year	All Mfg. Industries	Meat Packing
1922	5.94%	(.51)*%
1923	6.34	1.75
1924	5.15	1.80
1925	6.24	1.35
1926	6.08	1.26
1927	5.01	.54
1928	6.11	1.32
1929	6.55	1.04
1930	2.47	.90
1931	(2.68)*	(.65)*
Average	4.72%	.88%

Industry	10-year Avg.
Chemicals	7.90%
Printing and Publishing	7.82
Stone, Clay, Glass	7.09
Metal Products	5.72
Pulp, Paper, etc.	5.07
Misc. Mfg.	4.17
Food Products	3.37
Rubber	1.82
Leather	1.73
Textiles	1.69
Forest Products	1.30
Meat Packing	.88

( )* Represent Losses.

The figures in the two tables above showing "Percentage of Net Profits to Sales of Corporations" were taken from a publication of the Institute of American Meat Packers. That is one of the reasons figures for the years 1922 to 1931 were used. The second reason is that we are unable to compile figures for later years.

Undoubtedly livestock producers are more interested in profits per hundred pounds of livestock and per hundred pounds of dressed meat than per dollar of sales. In order to give them this information, the following table is offered:

Meat Packers' Profits per Hundred Pounds of Livestock and Dressed Meat

(Estimated by Institute of American Meat Packers from packers' reports to U. S. Department of Agriculture)

Year	Average Profit per Hundred Pounds Of Livestock	Of Dressed Meat
1925	$ .21	$ .34
1926	.19	.30
1927	.07	.12
1928	.21	.32
1929	.17	.26
1930	.14	.22
1931	(.09)*	(.14)*
1932	(.03)*	(.05)*
1933	.11	.17
1934	.15	.24
1935	.19	.32
1936	.14	.23
1937	.10	.17
Thirteen-year average, 1925-37	.12	.19

( )*—Loss.

There are two important reasons why unit profit per pound or per dollar of sales in the packing business is so small. In the first place, the packing business is not protected by patents or special privileges. Anyone with a small amount of capital can get into the business. It is evident that if earnings were very large, a great many more people would be attracted to the business. The result would be that the competition of these newcomers would very quickly wipe out all excessive profits. It is generally true that, in those businesses which are easily entered, profits are small. Competition sees to that.

There are now over 1,000 meat packers in the United States who are turning out the best meat products they know how to produce. They do not all buy livestock or sell meat products in the same markets; but Swift & Company, being a nation-wide organization, has to compete with every one of these packers. Wherever the company buys livestock, it has to buy in competition; and wherever it sells meats, it has to sell in competition with some of these packers. Incessant competition, both on the buying and selling end, has made it difficult for any of the 1,000 packers to earn more than a moderate profit.

The second reason why unit profit is small is that the gross margin for expenses is also small. This can be illustrated by actual figures from Swift & Company. Figures for 1938 would be used but as stated earlier in this bulletin, a loss occurred in that year so instead we are offering figures for 1937. Out of every dollar's worth of products (meats, dairy and poultry products, glands, hides, etc.), on the average, Swift & Company paid to producers of livestock and other agricultural products 75.8 cents. This leaves 24.2 cents to cover expenses and profits. Out of the 75.8 cents received by the producer, there must be deducted the costs of production and marketing. Out of the 24.2 cents which Swift & Company received, all expenses of buying, slaughtering, condemnation losses for diseased and bruised livestock, refrigeration, transportation of meat from packing plants to retailers, selling expenses, debt losses, and many other items of expense must be paid. Whatever is left is profit.

In other words, profits in the packing business can never be large enough to have an appreciable effect upon meat or livestock prices, due to the simpleness of its operations and because of the small gross margin, covering both expenses and profits.

Under these conditions, how is it that the packing business can make worthwhile profits? The secret of success in the packing business lies in being able to handle a large volume of business at a small profit on each pound of product or dollar of sales.

It is evident that a packing company should earn substantially more than its dividends in order to have funds for the necessary expansion of the business. Profits for meat-packing concerns as a whole have been relatively too small for the past several years. This condition creates a serious situation for both producers and consumers.

Capital invested in meat packing has been yielding a smaller return than in most other leading industries. However, it should be noted that although packer profits are relatively small, they are fairly steady. Swift & Company earnings over a long period have been quite uniform, as its financial record shows.

Because profits are small per unit, it is no sign that the packers are inefficient. On the contrary, the packing business has served as a model for other industries in the elimination of waste and in the high degree of practical and scientific efficiency attained; also in economy of operation. Our earnings have, in fact, come largely from savings in waste and economies in expense.

Swift & Company believes that the public is entitled to know the facts about its profits and the profits of others in the business. However, it does not wish to leave the impression that small profits of themselves are praiseworthy.

In the meat-packing business, as in other highly competitive industries, profits reflect the ability of the management. Good service to the public is a consequence of good management, and the profits of a well-managed packing company are not exacted from the people, but rather are a payment which they willingly make for what the company does for them.

Swift & Company
Chicago

Agricultural Research Bulletin
No. 17
July, 1939

Geography of Meat Production and Consumption

(Can be read in 4½ minutes)

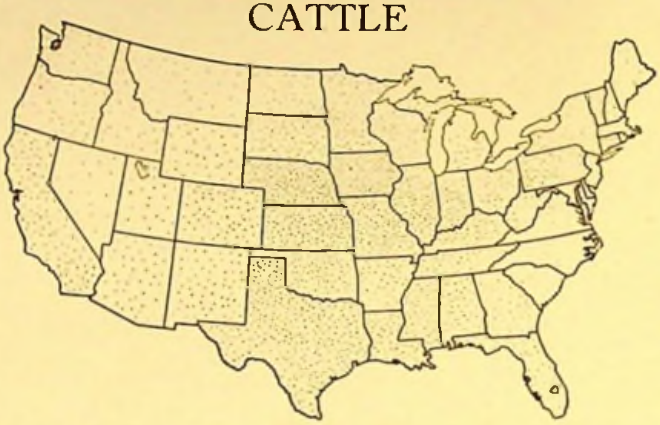
THE bulk of the livestock in the United States is produced WEST of the Mississippi River. On the other hand, the bulk of our meat consumption is EAST of the Mississippi, because that is where the greater part of the people live.

A bird's-eye view of these facts is presented in the maps on the center pages of this bulletin. The maps on Page 2 show the number of livestock on farms and ranches, as reported by the Bureau of Agricultural Economics for January 1, 1938. Of course, only a part of these animals is marketed in any one year. The maps on Page 3 show the quantities and where the different kinds of meats are consumed. Figures for beef and pork consumption are based on human population estimates for 1937 as reported by the Bureau of the Census and per capita consumption estimates prepared by the Bureau of Agricultural Economics for 1937. The map showing lamb consumption is based on the same human population figures as the other two and the per capita lamb consumption in different sections of the United States as found by the Institute of American Meat Packers. All of these figures are approximate. The number of dots on the livestock maps have no relationship to the number on the meats maps. The purpose of the dots is to show in a general way where the production of livestock and consumption of meats is concentrated.

Where Livestock Is Produced

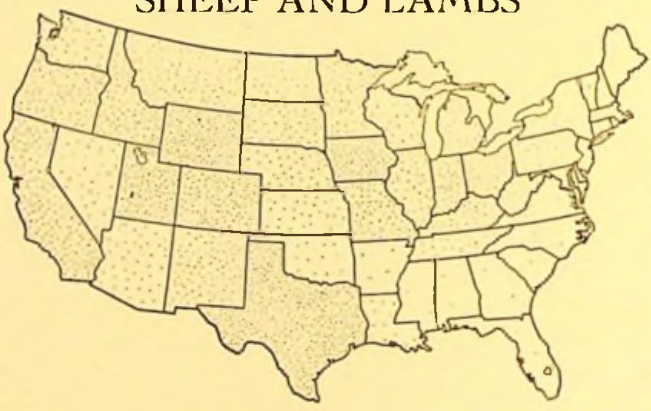
(One dot = 20,000 head of livestock)

CATTLE



HOGS

SHEEP AND LAMBS



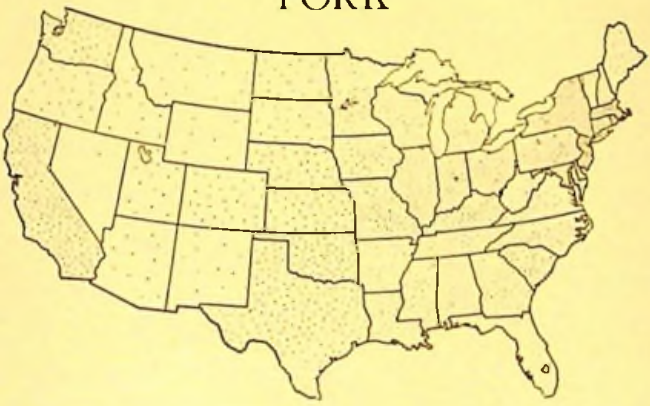
Number on farms January 1, 1938. Data from Bureau of Agricultural Economics.

Where Meats Are Consumed

(One dot = 2,000,000 pounds of meat)

BEEF

PORK



LAMB

Based on the Bureau of Census population estimates for 1937 and per capita meat consumption estimates by the Bureau of Agricultural Economics and the Institute of American Meat Packers

A study shows:

1. That about 63% of the cattle is raised west of the Mississippi, while about 70% of the beef is consumed east of the Mississippi;

2. That about 50% of the hogs is raised west of the Mississippi, while about 70% of the pork is consumed east of the Mississippi;

3. That over 80% of the lambs is raised west of the Mississippi, while about 78% of the lamb is consumed east of the Mississippi.

Either livestock or meats or both must be moved great distances from the surplus-producing regions of the West to the deficit-producing areas of the East. The average pound of meat is moved about 1,000 miles from where it is produced to where it is consumed.

The location of important meat-packing points for the different kinds of livestock has been influenced by the distance separating producers and consumers. The necessity of securing an adequate year-'round supply of the different grades and classes of livestock and of making possible the efficient utilization of by-products have had their effect. Meat-packing centers are usually near the areas of large livestock production because it is not economical to ship live animals farther than necessary on account of deaths, injuries, bruises, and shrinkage, in addition to freight costs.

Local slaughter takes care of a part of the industry. National distribution is an obvious necessity for the rest. Both these facts are made apparent by the maps.

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Swift & Company
Chicago

Agricultural Research Bulletin No. 19 May, 1940

Hog By-products

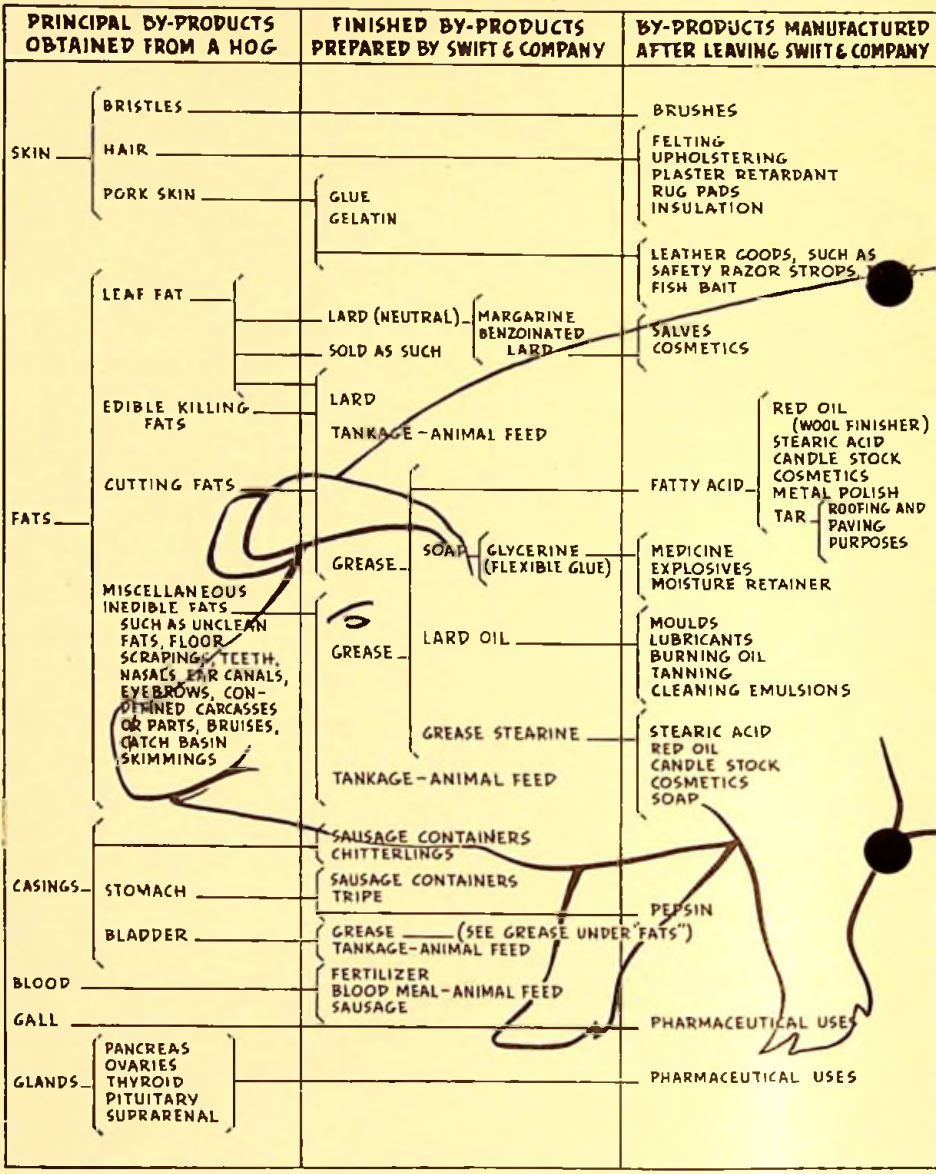
(Can be read in 9 minutes)

WHEN a meat packer buys a hog, he buys more than pork and lard. A hog is not just hams, shoulders, loins, bacon bellies, and lard. During the process of disassembling the hog, a large number of other products, both edible and inedible, are produced. Most of these are called "by-products."

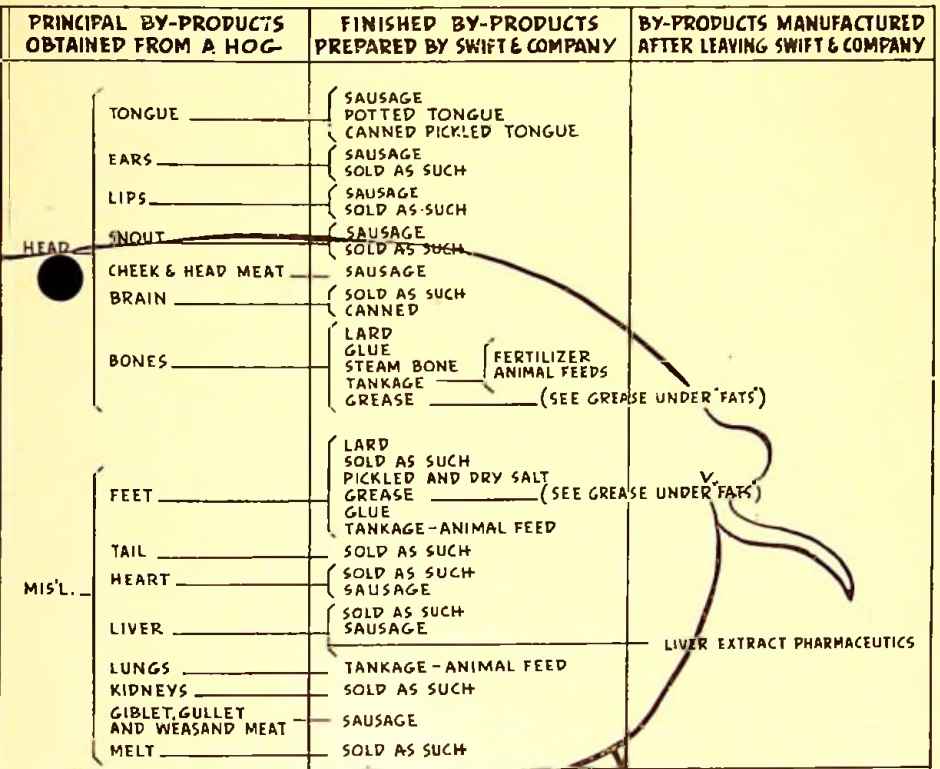
The edible hog by-products are known as "fancy meats." They include the kidney, liver, stomach, ears, brains, pork skins, snout, lips, gullet, and weasand meat. Fancy meats represent about 3½ per cent of the live weight of a hog. Many of these are regular items for sale in the modern retail meat store. Some edible hog products which are known as meat and not meat by-products, but which come under the "fancy meats" classification, are head and cheek meat, tongue, heart, tail, and feet.

Inedible by-products are numerous and represent about 2½ per cent of the live weight of a hog. They are of particular interest because of the many dozens of uses to which they are put in the lives of millions of people each day. For example, hair is used in mattresses, upholstery for furniture, automobiles, and passenger planes; insulation boards for refrigeration; air filters; baseball mitts; parachute seat pads, and other articles in which padding is required. Blood is used in making buttons, shoe polish, animal feeds, medicine, and in printing calico and refining sugar. Inedible fats find their way into soap, shaving cream, candles, salves, and lubricating oils. Bones go into glue, animal feeds, bone oil, and

HOG BY-P


PRINCIPAL BY-PRODUCTS OBTAINED FROM A HOG
FINISHED BY-PRODUCTS PREPARED BY SWIFT & COMPANY
BY-PRODUCTS MANUFACTURED AFTER LEAVING SWIFT & COMPANY
SKIN
BRISTLES
HAIR
PORK SKIN
GLUE
GELATIN
BRUSHES
FELTING
UPHOLSTERING
PLASTER RETARDANT
RUG PADS
INSULATION
LEATHER GOODS, SUCH AS SAFETY RAZOR STROPS
FISH BAIT
FATS
LEAF FAT
LARD (NEUTRAL)
MARGARINE
BENZOINATED LARD
SOLD AS SUCH
SALVES
COSMETICS
EDIBLE KILLING FATS
LARD
TANKAGE - ANIMAL FEED
CUTTING FATS
FATTY ACID
RED OIL (WOOL FINISHER)
STEARIC ACID
CANDLE STOCK
COSMETICS
METAL POLISH
TAR
ROOFING AND PAVING PURPOSES
SOAP
GLYCERINE (FLEXIBLE GLUE)
GREASE
MEDICINE
EXPLOSIVES
MOISTURE RETAINER
MISCELLANEOUS INEDIBLE FATS SUCH AS UNCLEAN FATS, FLOOR SCRAPINGS, TEETH, NASALS, EAR CANALS, EYEBROWS, CONDEMNED CARCASSES OR PARTS, BRUISES, CATCH BASIN SKIMMINGS
GREASE
LARD OIL
MOULDS
LUBRICANTS
BURNING OIL
TANNING
CLEANING EMULSIONS
GREASE STEARINE
STEARIC ACID
RED OIL
CANDLE STOCK
COSMETICS
SOAP
TANKAGE - ANIMAL FEED
CASINGS
STOMACH
SAUSAGE CONTAINERS
CHITTERLINGS
SAUSAGE CONTAINERS
TRIPE
PEPSIN
BLADDER
GREASE (SEE GREASE UNDER "FATS")
TANKAGE - ANIMAL FEED
BLOOD
FERTILIZER
BLOOD MEAL - ANIMAL FEED
SAUSAGE
GALL
PHARMACEUTICAL USES
GLANDS
PANCREAS
OVARIES
THYROID
PITUITARY
SUPRARENAL
PHARMACEUTICAL USES

RODUCTS



SUMMARY

	POUNDS OF PRODUCT IN AVERAGE HOG WEIGHING 250#	*PERCENTAGE OF GREEN PRODUCT TO LIVE WEIGHT OF HOG
1 PORK		
REGULAR HAMS	35.00	14.00
BELLIES	27.50	11.00
LOINS	23.75	9.50
PICNICS	13.75	5.50
BOSTON BUTTS	11.87	4.75
FAT BACKS	7.50	3.00
LEAN TRIMMINGS	7.50	3.00
JOWL BUTTS	5.00	2.00
SPARE RIBS	3.75	1.50
RENDERED LARD (INCLUDING LEAF)	32.50	13.00
MISCELLANEOUS (INCLUDING FANCY MEATS FROM THE HEAD)	12.50	5.00
2 SHRINKAGE	54.38	21.75
	235.00	94.00
EDIBLE BY-PRODUCTS		
3 LIVER, KIDNEY, CASINGS, GIBLET, GULLET AND WEASAND MEAT, ETC.	8.75	3.50
INEDIBLE BY-PRODUCTS		
GREASE, HAIR, BLOOD, TANKAGE, ETC.	6.25	2.50
TOTAL HOG	250.00	100.00

*In view of the many different methods of processing the various pork cuts, it would be impossible to give figures showing the percentage of finished product to the live weight as was done in our bulletins on cattle by-products and lamb by-products.

ornaments. Pork skins are used by shoe manufacturers, and also for razor strops, belts, and other leather goods. Casings are used for sausage containers.

Glands are also important hog by-products. People afflicted with diabetes, pernicious anemia, and many other diseases are treated by their doctors with insulin, liver extract, and other medicines made in whole or in part from the glands of hogs.

Although by no means complete, the chart on the inner pages of this leaflet shows the most important hog by-products and their uses. Some of these by-products receive final preparation in the meat packing plant, others go to separate businesses for final finishing or utilization.

Out of each average dollar the meat packer receives from the sale of all of the cuts of pork, lard, and by-products that he gets from hogs, approximately

96.3 cents comes from the meat and lard
2.2 cents comes from the edible by-products
1.5 cents comes from the inedible by-products
(Figures based on June 1937 prices.)

Meat packers have been very successful in finding ways to use the by-products not only from hogs, but also from cattle, calves, sheep, and lambs. Chemists are continually striving to find new and better uses for by-products in an effort to increase their value.

By-products are of great importance to the livestock and meat industry. Their utilization results in the livestock producer receiving more for his hogs, cattle, and lambs, and the consumer paying less for his meat than would be the case if the by-products were not utilized.

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Swift & Company
Chicago

Agricultural Research Bulletin No. 20 May, 1941

Preventing Losses in Handling Livestock

(Can be read in 20 minutes)

Livestock shipping losses and suggestions for their prevention are by no means new topics for discussion in the livestock and meat industry. But they are timely topics and will be so long as the problem they represent is with the industry. Until the time comes when every loss in shipping livestock is either eliminated or reduced as far as reasonably possible, these losses and the methods of preventing them should be common topics for discussion.

The damage done by faulty handling of livestock is best appreciated when the livestock arrives at a meat packing plant. On an average, ONE animal out of every SEVEN (counting all species) slaughtered in plants operating under Federal government inspection carries bruised meat that must be cut out. By government regulations, these trimmings cannot be used as meats for human consumption. Trimming results in both a loss in weight and a loss in the value of the meat because of the damaged appearance of the meat cuts remaining after the bruises are trimmed out. Worse yet, most of these bruises are on the hindquarters and across the back—those parts of the animal from which the highest-valued meat cuts are taken. In view of these facts, the estimates that the livestock and meat industry loses $9,000,000 from bruises each year seem none too large.

The loss from bruises is not the only loss. Crippling and death occur frequently and are a big loss to the industry.

[redacted]

Losses from bruising $9,000,000 annually.

[redacted]

Losses from crippling and death $3,000,000 annually.

[redacted]

Other losses (hidden damage to hides, deaths after arrival, etc.) $2,000,000 annually.

Figures from National Live Stock Loss Prevention Board.

Careful estimates place the combined loss from these two causes at more than $3,000,000 annually. Other losses such as death after arrival, inside ham bruises, amount to $2,000,000 annually.

None of the losses mentioned include those caused by cuts, holes, and other damage to hides. Many of these injuries do not appear until the hide is made into leather. Estimates made by the Tanners Council of America place this loss from concealed hide damage at approximately $700,000 annually.

A moment's calculation will show that the total loss caused by faulty handling of livestock averages around $14,000,000 every year. Out of whose pocket is this loss taken?

Without question, some part of the loss from bruising, crippling, and death of livestock falls on each branch of the livestock and meat industry. But the livestock producer undoubtedly pays the largest part of the total loss. An animal that dies on the way to market or at the market never reaches the meat packer and hence is almost a total loss to the producer. Crippled animals must be sold at a discount sufficient to offset the damage to the meat and bone where the injury occurred. Bruise losses also go back to the livestock producer. The amount of money producers can get for their livestock depends upon what the meat packer can get for meats and by-products. Hence, to the extent that bruises lower the value and amount of the meat cuts that a load of livestock will yield, the value of that livestock to the meat packer is also lowered. Even if an individual producer "gets by" without receiving a lessened price because of bruised livestock, still in the end the amount of the loss is averaged against all livestock producers.

Losses which the producer takes on the sale value of dead and crippled livestock are sometimes repaid through insurance or claims. But these repayments must be taken from the transportation rates and insurance premiums paid by producers on livestock shipments. Higher losses during shipment will tend toward higher freight and insurance costs to producers.

The responsibility for causing these losses can be distributed quite widely among the members of the livestock and meat industry. A study made by the National Live Stock Loss Prevention Board showed that about half the bruises found on livestock in packing houses were new bruises and half were old bruises. This indicates that livestock are continually being bruised, beginning in the feedlot, range, and pasture, and continuing to the livestock market. There is, however, very little bruising at the market itself.

Carcasses damaged by tipped horns.

Horns on cattle are an expensive decoration because they are the cause of large numbers of bruises. For this reason it would be well to dehorn all cattle that are to be marketed. This is easiest done, according to the National Live Stock Loss Prevention Board, by applying caustic potash to the buttons when the calves are from one to two weeks old. If the calves are not dehorned in this way they should be dehorned with a clipper or saw before being put into the feed lot.

Like bruise losses, most of the losses from crippling and death occur before the livestock reach the unloading platform at the market. In a two-year study made at a large and representative market, it was found that approximately 60% of the death losses on cattle and 80% of the death losses among hogs and lambs occurred on the range, in the feedlot, or during the trip to market. During this same two-year period, over two-thirds of the crippled cattle, nearly four-fifths of the crippled hogs, and more than two-thirds of the crippled sheep and lambs were crippled before they were unloaded at the market. Only a small part of the losses occurred after the livestock were unloaded in the market. Many of these losses, moreover, were traced to injuries suffered before the animals reached the market.

An interesting and important point to be noticed by livestock producers, shippers, and transportation agencies, is the fact that losses from crippling and death are often lower on shipments going 200 miles or more than on those moving shorter distances. Western lamb producers frequently ship lambs one thousand miles or more with fewer death and cripple losses than other producers have on lambs shipped or trucked less than 200 miles. This is easily explained. When the distance to market is short, the natural, human tendency is to be less careful in observing the rules of good shipping. On short shipments, livestock trucks and cars are often overloaded to save transportation costs. Or, if there is less than a full car or truckload of livestock, no partitions are used to keep the animals in a compact group where they can brace against each other. Bedding is also likely to be neglected. Very often

Use a canvas slapper for driving livestock and avoid many bruises.

the result is a loss that more than offsets any saving of time or money from not following good shipping practices.

So much for the problem of livestock losses, their extent, and how, where, and when they occur. When these facts are fully appreciated, the next step is for each member of the livestock and meat industry who handles livestock to set out and follow some reasonable set of rules for preventing livestock losses. With that in mind, there is listed below a set of rules which may be followed in preventing losses. Although by no means complete, the rules listed cover the field generally, and are those now being followed by careful producers, shippers, and others handling livestock.

DRIVING

Outlaw the club, whip, and similar instruments of injury when handling livestock. Other instruments can be used to drive livestock equally well and without bruising. One of these, the canvas "slapper," is made of two strips of canvas several feet long and about five inches wide. These canvas strips are sewed together, filled with padding, and attached to a handle. When used on livestock, the "slapper" stings but does not bruise. One of these slappers can be obtained at cost from the National Live Stock Loss Prevention Board.* On the date of publication of this bulletin, the Board was selling slappers at 25c each. A slightly better style with a loop handle was selling for 35c each. Another instrument, developed by Purdue University, is a special short-strawed broom with a long handle. A third instrument is the electric "shocker." This is simply a handle about 18 inches long containing dry cells wired to contact points in the end of the handle. When the animal is touched with the contact points, it receives a slight shock—and moves.

FEEDING

Death losses from overfeeding are common. Avoid this danger by giving cattle and sheep little or no grain and a moderate amount of water during the last few hours before shipment. Hogs may have not over half the usual amount of grain, and this should be fed at least twelve hours before loading.

Losses from overfeeding are highest on hogs, and particularly so during the summer. When a hog has reached market

*Exchange Building, Union Stock Yards, Chicago, Ill.

weight, fat has accumulated so thickly around the internal organs that the lungs, heart, and stomach are crowded into a very small space. This leaves too little room for all of these organs to function to capacity at the same time. When the hog's stomach is full from overfeeding, the heart and lungs have the burden of throwing off the excess heat generated, but almost no room in which to expand and function. This condition is not so dangerous in the feedlot, but when the hogs are crowded into a car or truck on a summer day, the danger of suffocation is great.

No species of livestock should ever be given salt on the day of shipment. Salting before shipment causes an overfill on water at the market, resulting in a bloated, paunchy condition which gives any species of livestock a bad appearance in the sale pen and sometimes results in death loss. Buyers bids are also lower on such livestock.

BEDDING

Good bedding is important. Lack of it may cause losses from death by suffocation or freezing, or loss from crippling and bruising when livestock slip and fall on an unbedded floor. Before bedding, clean the car or truck thoroughly. Losses in clean cars are lower than in uncleaned cars. Then use either straw or sand, or both. If the temperature is under 50° F., use clean, dry straw, at least two bales to a single deck stock car, and about one bale to the average single deck truck bed. Scatter the straw evenly over the floor. A layer of sand under the straw will give better footing and thus prevent frequent slipping and falling. Animals trampled are badly bruised and sometimes killed in transit. Fodder and dirt make very poor bedding. Cinders are objectionable for hogs because they sometimes eat them. The sharp edges cause internal injuries damaging the casings.

A badly bruised side of a hog. Note that the more expensive cuts, namely, ham, loin, and belly, have received the most damage.

When the temperature is above 50° F., bed the floor an inch deep with clean sand. Be sure the sand is free from rocks or gravel that will roll under foot or become imbedded in the animals' hoofs. A stone in the hoof makes an animal limp like a cripple.

When the weather is warm, wetting the sand thoroughly before loading will give additional insurance against possible death losses. On long trips to market during hot weather, wet the sand as often as necessary along the route. Railroads provide facilities for this purpose. Good truckers are willing to stop when necessary.

Some experienced shippers report excellent results from the use of ice in livestock cars and trucks carrying hogs during the summer. Several cakes of ice scattered about the floor will be very effective.

LOADING AND UNLOADING

"Easy does it" is a good rule to follow in loading and unloading livestock. Most farm animals are naturally suspicious of strange places and should be handled quietly. The use of whips, clubs, and canes makes some animals more stubborn than ever, to say nothing of causing bruises and an occasional broken leg.

Chutes should be stoutly constructed. Thick flooring will prevent heavy animals from breaking through and being injured. The sides should be built high to prevent jumping overboard, a frequent cause of broken legs, delays, and lost tempers.

Plans for building loading chutes for farm and truck use can be obtained by writing the National Live Stock Loss Prevention Board.

When either loading or unloading livestock, be sure the door of the stock car or truck comes squarely up to the end of the chute. An open space between the two invites broken legs.

Trucks sometimes have low cross rods and narrow, low end gates. See that these are removed or at least adjusted high enough that livestock can walk in or out of the truck easily without bruising their backs.

NUMBER OF HEAD IN CAR

Overloading and underloading of stock cars and trucks are frequent causes of death and injury. Most of these injuries occur on short shipments where the rules of loading are not followed carefully. In loading livestock on railroad cars, follow the table on top of next page showing the number of head of livestock to load in one car, considering the average weight of the animals and the length of the car.

CATTLE PER RAILROAD CAR

Average weight	300	400	500	600	700	800	900	1000	1100	1200	1300	1400
36-ft. car	60	50	42	37	33	30	27	25	23	22	21	19
40-ft. car	67	56	46	40	37	33	30	27	25	23	22	21

HOGS PER RAILROAD CAR

Average weight	100	125	150	175	200	225	250	275	300	325	350	400
36-ft. car	130	115	100	89	79	73	68	62	59	56	53	47
40-ft. car	140	127	110	98	88	82	76	69	65	62	59	52

SHEEP AND LAMBS PER RAILROAD CAR

Average weight	50	60	70	80	90	100	110	120	130	140	150	160	170	180
36-ft. car	155	143	131	120	112	105	101	97	93	89	85	81	78	75
40-ft. car	170	156	143	133	124	116	111	106	102	98	94	90	86	83

Above figures are for single-deck cars. In loading hogs or sheep in double-deck cars, the number loaded in the upper deck should be eight to ten less than that recommended for loading in lower-deck or single-deck cars, especially during hot weather.

If there are too few livestock for a full car, use a partition to cut off the excess space. The space left for the livestock should be small enough that the animals will stand fairly close together. Over-crowding, however, should be carefully avoided. Follow these same rules in loading trucks.

MIXED SPECIES

Separate different species of livestock with partitions. Partitions should be stoutly constructed and fastened securely to a strong upright. Bulls, boars, stags, and horned animals should be tied securely by the head or penned in a corner with a strong partition. If these animals are loose, they may do serious damage.

NAILS, BOLTS, AND WIRES

A few minutes spent in inspecting the car or truck for sharp nails, bolts, and wires, and removing those found, is good protection against bruises and damage to hides.

FOOTING

Make sure that every chute used in loading and unloading is equipped with cleats to prevent slipping.

GENERAL

There's an old saying, "The eye of the master fattens the cattle." This may be interpreted to mean that a stockman's

Damage caused by lifting sheep and lamb by wool.

careful, considerable attention to the needs of his livestock is largely responsible for their gains in the feed lot.

In much the same way, the "eye of the master" can protect livestock against bruising, crippling, and death. These losses are caused in so many ways that it is practically impossible to list them all and warn against each one. The good stockman or stock handler, however, will be on the lookout for each of these dangers and protect his livestock against it. In the long run, this small amount of care will be money in the stockman's pocket and a saving to the entire livestock and meat industry.

Extremely beneficial in the campaign to reduce livestock losses has been the work done by the Future Farmers of America, by 4-H Clubs, high school students of agriculture, and their leaders and instructors. For the benefit of livestock producers, and the livestock and meat industry as a whole, this work should be encouraged. It is hoped that this bulletin will be of some help in that connection.

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Additional copies of this bulletin are available upon request.

Swift & Company
Chicago

Agricultural Research Bulletin No. 1 Revised October, 1941

List and Index of Agricultural Research Bulletins

SWIFT & COMPANY publishes a series of "Agricultural Research Bulletins." These are issued from time to time, not at regular intervals.

The "Bulletins" discuss briefly various phases of the livestock and meat-packing industry. The subject matter is of interest to producers of livestock and dairy and poultry products, teachers and students of agriculture, county agents, and anyone in a similar business. A list of the bulletins to date appears on Page 2. The index on the following pages lists the subjects in Bulletins 1 to 20.

Copies of any one or all of these bulletins will be sent on request.

Swift & Company
Agricultural Research

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