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IMPORTANT PRODUCTS IN THE CANNED AND FROZEN FISH TRADE

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CANNED FISHERY PRODUCTS

Supply Situation

Prospects are good for a larger civilian supply of canned fish in 1947 than in 1946. However, adequate supplies to meet the consumer's needs may not reach the market until late in 1947. The 1947 pack of canned fish is expected to be somewhat larger than that of 1946 on the basis of indicated improvements in the availability of supplies, materials, and labor. Government set-asides which at one time took up to 80 percent of canned fish packs, have been discontinued. Export demand for canned fish in 1947 will probably continue large. Imports are expected to increase due to improvements in conditions existing in foreign countries.

Tin restrictions have been lifted on a number of items which were not allowed for packing during the war. Nevertheless, supplies of tin entering the country are low, and these, of course, must be shared with numerous other foods packed in tin.

The 1946 pack which totaled 657 million pounds, was considerably below the 1935-39 average of about 690 million pounds. Government purchases declined while both imports and commercial exports increased. Packs of both salmon and pilchards were short in 1946. The tuna pack, however, was the largest in history.

Canned Fishery Products as Food

While nutritional value is given more consideration than formerly, attractive appearance, palatability and price are deciding factors in determining the diet of the average consumer. Nutritive value, appetite appeal, amount of waste, cost, variety of choice, ease of purchase, and ability to purchase in convenient amounts and packages, are factors used in the purchase of foods. The food buyer wants to know how canned fishery products meet these requirements.

Canned fishery products are a source of highly-digestible protein of excellent and nutritive value. One serving portion a day will supply the daily requirements for animal proteins in the diet. The need for protein by animal life, for building muscle tissue and for other purposes, is more specifically a need for certain amino acids than for the total protein as a unit. Ten of some twenty amino acids must each be supplied in the diet in amounts sufficient for maintenance of body tissues, but the others that are needed can be manufactured by body processes from fragments of those which are not essential. The few chemical studies which have been reported show that the proteins from fish contain the essential amino acids in proportions permitting economical utilization of the protein. Numerous experiments have shown that the nutritive value of fish is equal to that of meat and poultry. Canned fishery products provide a good source of some vitamins and nutritively-necessary minerals.

Canned fishery products can be prepared in a variety of appetizing dishes. Weight for weight, the more important canned fish items are less expensive than the more popular cuts of meat. No special equipment is required to handle canned fish and there is no spoilage loss. Canned fish are offered in an excellent variety and are available in individual containers ranging from 2½ ounces to five pounds. From all points of view of the consumer interest,

canned fishery products meet his requirements, and can be included in the daily diet with full confidence that they supply high quality food from the nutritional standpoint and satisfying flavor and texture at a reasonable cost.

A number of fishery products, packed in hermetically-sealed glass or tin containers under vacuum, which have not been "sterilized" or "processed" by heat, but which are generally included among canned products, are listed in this report. Preservation of these products is possible only for limited periods which may be sharply reduced by unfavorable conditions of storage and handling. The products depend for preservation on the curing to which they are subject previous to packing, and on subsequent storage at low temperatures. Items requiring refrigeration are^{so} indicated.

Canned Fish

ALEWIVES OR RIVER HERRING. - Packed on the Atlantic coast, mainly in the Chesapeake Bay area, in No. 300 and No. 2 cans.

ANCHOVIES. - Two types of anchovies are packed, Spanish or Italian anchovies, and the Norwegian or Swedish anchovies. The former are the true anchovies, while the second variety is made from the bristling or sprat. The methods of cure also differ. Spanish or Italian anchovies are cured by a process which depends on fermentation to give the product the desired flavor. Norwegian or Swedish anchovies are flavored with salt and spices, and the curing is not a fermentation process. Since few anchovies are cured domestically, those packaged in this country are imported. They are received in wooden kegs and repacked in glass and tin containers holding from one to eight ounces. More glass than tin containers are used for this purpose in the United States. Most anchovies imported in individual containers are packed in tin. Imported cans are not standardized, many odd-sized containers being used. Most of these are "flat" or "square" pressed tins of the type used for sardines or kipper snacks. This product should be kept under refrigeration.

CARP. - This is a recently-developed product, prepared from carp caught in fresh-water lakes and rivers. It is precooked, flaked and packed in salad oil with salt added, in 6 and 12-ounce cans, tuna-style. Also canned are smoked carp flakes in 13-ounce sizes. Packed also as "gefilte fish."

CAVIAR. - The roe of any fish preserved by salting. The word "caviar" originally applied to the sturgeon roe. Any other roe treated as caviar must bear the name of the type of fish from which it was obtained, such as salmon caviar, whitefish caviar and herring caviar. Caviar should be shipped and held in chill storage at 34° to 36° F., or held by the retailer in refrigerated show-cases. To secure maximum preservation, the containers should be held at temperatures not greater than 40° F., or less than 29° F.

While some sturgeon caviar canned in this country is of domestic origin, most of the pack is made from caviar imported from the U.S.S.R. Caviar is received in large containers and is filled into cans holding 1½ to two ounces, four ounces, eight ounces, and "nappy" glass jars with about the same net weights. Containers are sealed in a vacuum closing machine. Sturgeon caviar is generally black, but sometimes it is brownish or gray in color.

Whitefish caviar is prepared commercially in the Great Lakes region and in New York from the roe of the whitefish. It is packed in glass and tin

containers of the same size as those used in marketing sturgeon caviar. The quality is usually excellent, and the price is much lower than that of sturgeon caviar.

Salmon caviar was originated about 1910 by a Siberian fisherman, and the preparation is a modification of the sturgeon caviar method. Salmon caviar is red. "Nappy" glass jars holding two or four ounces are probably the most widely-used containers, though salmon caviar is also packed in glass tumblers holding six ounces, and in tin cans with a net weight of two to seven ounces.

Herring caviar prepared from the alewife or river herring roe and the lake herring roe has grown quite popular during the war years. It is packed in sizes similar to sturgeon caviar.

CODFISH. - Shredded, fibered, threaded or fluffed salted codfish, put up in bricks, cartons or wooden boxes, are packed principally in New England. Fresh or canned fish cannot substitute with complete satisfaction in certain favorite dishes where salt cod has always been used. The modern grocer, however, hesitates to handle salt cod because of the odor which develops after curing, which, under ordinary conditions of handling, will drive customers away. The use of hermetically-sealed vacuum pack containers removes the odor objection and results in salt codfish reaching the retail market with flavor, color, texture, and moisture content of freshly-cured fish. No "sterilization" process is used; therefore, the period of preservation is limited. The principal use of this product is in the preparation of codfish cakes. It should be kept out of strong light if packed in glass or other transparent material. (Also see fish cakes and balls).

EELS. - This is a specialty pack which was formerly imported, but the domestic product now has acquired a portion of the market. They are prepared as smoked or pickled eels. Smoked eels are cut in container-length pieces and hand-packed into containers which are then filled with olive or cottonseed oil, and spice-flavored to suit the packer. Cans used may be No. 300, half-pound or one-pound flats, ovals or square cans such as used in sardine canning. Some smoked eel is also packed in eight-ounce glass tumblers. There is no standard or usual-sized container.

Pickled eels are prepared by parboiling in a weak vinegar solution; then packing into containers with a few dry spices and a weak vinegar solution. Containers used are five-ounce and eight-ounce glass, and half and one-pound flat cans. Some pickled eels are packed in a jelly.

FINNAN HADDIE. - This product is prepared from haddock which are brined lightly, dried, and then lightly smoked. The smoked fish is steamed, separated from skin and bone, and packed in cans to net weight of four, twelve and sixteen ounces. A small amount is also packed in glass tumblers. The filled cans are sealed and processed under pressure. Some canned finnan haddie, in one-pound ovals, is imported from the British Isles.

FISH CAKES AND BALLS. - The best quality salt cod and Green Mountain potatoes are generally used by canners of codfish cakes. Other species such as haddock, pollock, cusk, and hake are sometimes used in the preparation of fish cakes. This product is ready-prepared in cans for immediate use. Pack is in 10-ounce cans.

While a portion of the domestic supply of Norwegian-style fish balls (Fiskeboller) is imported from Norway, some are also packed by canners in the United States. For this product, haddock is generally used.

FISH CHOWDER. - The fish most generally used are haddock. Other ingredients usually include potatoes, flour, onion, salt pork, fish broth and seasoning.

FISH FLAKES. - A combination of cod and haddock, packed on the New England coast. Pollock flakes, hake flakes, and flounder flakes are also packed. The fish are placed in brine, cooked with live steam until tender; then the bones are separated and the flakes are packed. Pack is in tins, No. 300 and No. 2 cans. Also, some packs are in glass.

FISH ROE. - Several types of fish roe are canned in the United States, and there are indications of a much wider utilization of fish roe in canning. The alewife or river herring, shad, mackerel and groundfish roe are the principal varieties now on the markets.

Alewife roe is canned in the Chesapeake and North Carolina region. It is put up in No. 300 and 1/2 oval cans.

"Deep Sea" roe is canned from the roe of groundfish such as cod, haddock, etc., and is a product of the New England trawl fishery. This roe is packed in No. 300 cans.

Shad roe is canned on both coasts and is marketed in half-pound oval cans, one-pound oval cans and nine-ounce square containers.

Mackerel roe is put up in No. 300 cans.

HERRING. - Packed in many styles. The fish is one of the most plentiful in existence. Larger fish are canned as "sea herring." Smaller fish are canned as "sardines." Kippered herring are canned from fish lightly salted and smoked.

Sea herring are packed in much the same manner as salmon. Heads and tails are cut off and the herring is filled into cans. Some herring is packed in tomato sauce. The can size is usually No. 300. This pack has developed from practically nothing in 1940 to about 100,000 cases annually in recent years.

Kippered herring are lightly salted and smoked before canning. Most of the canned kippered herring sold in the United States is imported either from Great Britain or Norway. A small amount of canned kippered herring is packed in Maine and New Brunswick, Canada.

Pickled, spiced, or cured herring are packed in glass in several forms such as cut, spiced, rollmops, bismarck herring, marinated and smoked herring. These products should be kept under refrigeration and out of strong light. The length of preservation depends on the care in manufacture and storage.

Certain packers prefer special types of fish for preparing spiced fish. The domestic pack is made up principally of Chesapeake Bay herring. However, considerable salted herring is obtained from Alaska, Newfoundland, Labrador, Holland, Norway and Iceland for use in packing pickled fish.

Spiced herring, as packed in the United States, is prepared entirely from cured fish. Herring may be specially cured for this product, or "Scotch cured" or Labrador salt herring may be substituted. Herring not/ specially cured

for spicing is reported to have a shorter period of preservation, is darker in color, lacks flavor, and is tougher and more fibrous in texture. Most of the specially cured herring is prepared from the alewife or river herring in the Chesapeake Bay area.

"Cut-spiced" are herring cut in cross sections, with onions, lemons, spices and other seasoning added, to give the desired flavor. The amount of each may be varied to suit the taste of the packer or his market. They are sometimes packed in wine sauce made from wine concentrate, in eight-ounce, sixteen-ounce and thirty two-ounce jars.

Rollmops are usually made from boned fillets and may be rolled around pieces of pickle, onion, and packed in vinegar and spices.

Bismarck herring are prepared from fish from which the backbone is removed, but the sides remain joined. Fish are boned and trimmed, and packed vertically in glass containers of various sizes, in vinegar and spices.

Marinated herring are those packed in a white sauce which is made by adding the ground milt from the male herring to vinegar and spices.

MACKEREL. -- Atlantic mackerel are canned in Maine, Massachusetts, and Maryland. During recent years this pack has increased from 10,000 cases in 1939 to around 200,000 cases in 1946. The pack is almost entirely salmon-style and in No. 300 cans. A small quantity is canned as fillets.

Pacific mackerel is packed in the southern California area and is prepared salmon-style and as fillets. While most of the pack is canned "natural" style, tomato sauce or spiced vinegar sauce is added to some packs, mostly on special order.

MENHADEN. -- Packed salmon-style in No. 300 cans. Pack developed from small production in 1942 to more than 50,000 cases in 1945.

PILCHARDS. -- See sardines.

ROCKFISH. -- Packed on the Pacific coast in 7-ounce cans, tuna-style.

SALMON. -- Easily the most important and widely-distributed canned fish item. The 1946 pack of 4,404,000 standard cases by canneries in the United States and Alaska was the smallest since 1927. It is expected that the pack will be somewhat larger in 1947. Government set-asides which at one time took up to 30 percent of the pack, have been discontinued as of March 9, 1947. This will make more salmon available for distribution to consumer outlets.

The can of salmon should never be shaken because this breaks up the flakes and gives the fish an unpleasant and mushy appearance. In packing salmon, nothing is added except a little salt and in some instances, salmon oil. Salmon packing is principally in cans of three sizes, No. 1 tall, containing 16 ounces; No. 1 flat, containing 15½ ounces; and No. 1/2 flat, containing 7-3/4 ounces.

The six varieties of salmon are:

(1) Chinook salmon also called king or spring, is the largest of the Pacific salmon. The flesh after canning is firm and tender, falling apart easily into large flakes. A typical salmon, pink in color, it is extremely rich in oil of deep orange-red color. Because the fish is so big, there is

more meat and less skin to the can. This and red salmon are the most attractive in appearance and flavor. Chinook is especially fine for salads and other cold dishes.

(2) Red, Sockeye, Alaska Red, or Blueback salmon. This fish is relatively small in comparison with other species of salmon. The flesh is deep orange-red in color, and the oil is red, flesh is firm, flakes are small, and so is the bone. This fish is fine for salads and cold dishes, and also for cooked dishes.

(3) Medium Red, Coho, or Silver, or Silversides salmon. This is the second largest of the Pacific salmon. The name "medium red" was acquired from the color of the flesh which is usually somewhat lighter in shade than that of red salmon, but deeper than the chinook. The oil is yellowish-red. The meat of this fish is firm, but somewhat softer than that of the red salmon, and there is less oil. This variety is good for all purposes.

(4) Pink salmon. This is the smallest of the Pacific salmon, but the most abundant. Although the flesh is rather light in color, the delicate flavor, tender texture and high food value have made it quite popular, while its abundance has permitted the price to remain comparatively low. The flesh is pink in the better grades and paler in others, and is tender and milder in flavor than the red salmon. It has comparatively little oil, the flakes are small, and the bone is small. It is good for sandwiches, croquettes, loaves, creamed dishes, soups and chowder.

(5) Chum or Keta salmon. The flesh which ranges in color from pale pink to yellowish-white, is firm in texture. The flakes are large. The oil is light in color but there is little of it. The flavor is stronger than that of pink. As a rule, this species when caught has little color and less oil than other varieties. Consequently, canned chum salmon brings a lower price, although it is high in food value. It is good for salmon loaf, creamed dishes and casseroles.

(6) Steelhead. The steelhead trout is commonly considered as one of the salmon, but does not belong to the same family. It is more closely related to the Atlantic salmon. The color of the flesh which is pale-pink, fades almost to white in the canned product which is very rich in pale-yellow oil. Very little of this species is preserved by canning, due to its lack of color.

Smoked salmon. Mild-cured chinook salmon is used in some instances for the preparation of canned smoked salmon, although considerably larger packs from fresh salmon, lightly salted, have been packed recently. Norwegian pack is made from fresh salmon and some mild-cured pink salmon is used in Japan. The domestic pack is mainly in 1/2 flat cans.

Salmon spread is made from salmon, mayonnaise, flavoring ingredients and a wheat flour binder.

Sliced salmon is prepared from mild-cured salmon which may have been further processed by smoking. It is prepared by cutting in transverse slices, making a very attractive appearance. It should be kept under refrigeration for best results.

SARDINES. - The sardine canning industry of the United States is located in Maine and California. In Maine the small herring is the basis of the industry, while in California, the pilchard is used. Any small clupeoid fish may be canned as sardines, but the word "sardine" on the label of the can should be

accompanied with the name of the country or State in which the fish are taken and prepared. In eastern Canada, the young herring are prepared and packed as sardines. In Norway, the brisling and sild or herring are packed. France, Spain and Portugal pack the pilchard.

Maine sardines. The sardine canning industry of the Atlantic coast is located in Maine and the adjacent Canadian provinces of New Brunswick and Nova Scotia. The raw material used is the sea herring. The fishing season commences during the middle of April and may extend to the first week in December. Special packs contain as much as 30 small fish. Fish packing 11 or 12 to the one-quarter size can, are considered the most desirable size. By far the greatest part of the pack is put up as sardines in "oil." Winter-pressed cottonseed oil customarily is used. Some fancy grades are packed in imported olive oil. Corn oil formerly was used to some extent, but soybean oils have been used more frequently of late. Mustard or tomato sauce is sometimes used instead of oil, usually with fish of larger size, running from 4 to 5 to the one-quarter size can. Some sardines are packed in special spiced oil, and other special sauces for certain markets. Maine packs in flat, oblong cans, running from 1/4 key to 3/4 key sizes, in cotton and soybean oil; and larger fish in tomato or mustard sauce in No. 1 oval cans. Smoked sardines are also packed in Maine.

California sardines, also known as pilchards, are packed in the No. 1 tall cans for the natural pack, and No. 1 oval cans for the larger fish in tomato or mustard sauce, usually four to seven fish to the can. The sardine packing season extends from August 1 to February 28. Specialty packs of sardines in brine, in oil, fillets, smoked fillets and smoked sardines in tomato sauce are also prepared for some markets.

Foreign packs. Portuguese sardines are packed both with and without bones and skin. Sweden packs considerable quantities of sardines in a similar manner to Norwegian sardines, both smoked and unsmoked, in oil. Increasing quantities of these products will be available for import.

SHAD. - Canned salmon-style, whole and as fillets, and also kippered. The texture is slightly soft, but firm enough so that contents can be removed in a solid cylinder. The color of the flesh is somewhat darker than that of freshly-cooked shad. Shad are canned in No. 300 cans, one-pound tall, and 1/2 flat cans. Fillets are packed in eight-ounce "square" cans such as used in sardine canning. Kippered or barbecued shad is canned on the Pacific coast.

STURGEON. - Canned plain or in tomato sauce, kippered or smoked.

TUNA. - The following species are entitled to be labeled "tuna": albacore or longfinned tuna; bluefin or leaping tuna; yellowfin tuna; and striped tuna or shipjack. Bonito, a closely-related species and yellowtail, may not carry the name "tuna" on the can. White-meat tuna is prepared from albacore and commands the highest price. Light-meat tuna is prepared from all other varieties. Tuna is packed in No. 1/2 round cans containing seven-ounces net weight of solid meat, or six-ounces of flakes or grated. No. 1 tuna contains 13-ounces of solid meat and 12-ounces of flakes or grated; and No. 1/4 cans, 3 1/2 ounces of solid meat.

White-meat tuna. Fish must be of albacore or longfin tuna, which became almost extinct in American waters some years ago, but are now returning in quantity.

Fancy solid pack. Choice cuts of cooked tuna. Large pieces of solid meat. The bulk of this pack is made up of yellowfin tuna. It is by far the largest selling variety in this country. There is a wider variation in color, flavor, and texture in the yellowfin than in any other variety. The color is light, almost white in many instances. Yellowfin may be labeled light-meat tuna but not white-meat tuna.

Standard yellowfin. Packed from the balance of the yellowfin catch. It contains not over 25 percent of flakes. This may be labeled light-meat tuna.

Standard striped tuna. Generally known as standard light-meat tuna. Packed from striped tuna or skipjack, the species that ranks second in commercial importance. The color, generally a pinkish-tan; the flavor is more gamey and is preferred by many people over that of any other tuna. Packing contains not more than 25 percent of flakes. May be labeled light-meat tuna.

Standard bluefin. Packed from bluefin tuna containing not more than 25 percent of flakes. The flesh is deep pink to tan, the flavor more pronounced than other species and the flesh is softer. It may be labeled light meat tuna.

Tuna flakes. A packing from all species. Made up entirely of smaller pieces broken during handling and packing.

Grated style tuna. Ground by mechanical means to give uniformity of sizes, pieces and color. Any variety of tuna may be included.

Tomato. A special pack put up for the Italian trade in America. Packed from yellowfin, striped or bluefin, with extra salt and olive oil used.

Tuna fish spread is a specialty product made from tuna fish, mayonnaise, flavoring ingredients and a wheat flour binder.

WHITING OR SILVER HAKE. - Canned in the Chesapeake Bay area. Prepared salmon-style in No. 300 cans.

Canned Shellfish, Etc.

CLAMS. - Five types of clams are used for packing, hard-shell clams known as little-neck, quahog, and butter clams, the soft clam or long-neck, razor clam, pismo clam, and the surf or skimmer clam.

Of those considered hard clams, butter clams and little-neck clams are found in Oregon, Washington, British Columbia and Alaska. The quahog is found from New England to the coast of Texas. Hard clam products are canned in Massachusetts, Rhode Island, New York, New Jersey, Pennsylvania, Florida, Washington, California and Alaska. Razor clams are canned in Washington and Alaska. Soft clams are canned only in Maine. The surf or skimmer clam is canned in Maine and packed as minced clams. Pismo clams are canned in California from clams imported from Mexico. Clams are packed as whole clams, minced clams, clam chowder, and clam juice, broth or nectar.

For whole and minced clams, Food and Drug regulations require 50 percent drained weight of meats in the can. These are packed in No. 1/2 flat, No. 1 picnic, No. 1 tall, No. 2 and No. 10 cans.

Clam juice, broth or nectar is prepared from the large amounts of liquid extracted from the clams which contain soluble proteins and other food materials. Clam liquor is packed in tin containers as follows: No. 1 picnic, 1-pound tall, No. 2 and No. 3 cans; in glass, in eight-ounce, sixteen-ounce and 32-ounce sizes. Canning technologists give the following nomenclature to the various packs: clam juice is liquor extracted in opening clams, which is canned without dilution; clam broth is liquor diluted with water; and clam nectar is liquor obtained by boiling trimmings in water and concentrating by evaporation.

Clam chowder. Two types of clam chowder are canned, "Manhattan," "Rhode Island" or "Coney Island" chowder; and the "New England" variety. The method of packing New England clam chowder is generally the same in all plants, but the formula for Manhattan chowder differs with each packer. Both soft clams and quahogs are used, the species depending upon whichever is most abundant. Quahogs are preferred by some packers as the clam flavor is stronger. Manhattan chowder may contain such items as cracker crumbs, salt pork, onions and tomatoes. New England chowder includes ingredients such as potatoes, pork, onions, cereal "filler" and seasoning. No tomatoes are included.

CONCHS. -- A small quantity is canned in Florida.

CRAB MEAT. -- Formerly a large part of the supply came from Japan which packed the king crab, a large deep-sea crab. Some king crabs are caught in Siberian waters and packed by Russia. King crabs are caught in Alaska and some canning of this species is done. Crab meat packed in the northwest and Alaska is principally the dungeness variety which is smaller than the king crab and is of delicious flavor. The familiar blue crab is canned on the Atlantic coast in North Carolina, South Carolina, Mississippi and Louisiana, while the rock crab is canned in Maine and Massachusetts. Successful commercial canning of the latter varieties and the king crab is a recent development.

Dungeness crabs are packed in cans of three sizes, 1/2 flats, one-pound flats, and No. 2 cans with net weights of $6\frac{1}{2}$, 13 and 17-ounces respectively. King crab meat is packed in cans known as "quarters," "halves," "ones," with fill-in weights of $3\frac{1}{2}$, $6\frac{1}{2}$ and 13 ounces respectively. The blue-crab is packed mainly in $\frac{1}{2}$ -flat cans and is prepared also as deviled crab and crab cocktail.

"Cold-pack" crab meat. A considerable portion of the Pacific coast "dungeness" and most of the eastern blue crab is marketed as fresh cooked meat, packed in hermetically-sealed tins and shipped in ice. This is known as "cold-pack" crab meat. Usually it is packed in No. 10 cans lined with vegetable parchment paper to a net weight of five pounds, or in one or two-pound lithographed cans. This product must be held under refrigeration.

CRAWFISH. -- Also called "crayfish." Canned commercially as crawfish bisque in Louisiana and Mississippi. Each packer uses a secret formula, usually consisting of onions, butter, olive oil, flour, canned tomatoes, chicken consomme, spices and seasoning. The crawfish is a small crustacean, similar to the lobster in appearance. It is found in fresh water.

FROG LEGS. -- Small quantities of frog legs are canned commercially in the Gulf area. As a rule, only hind legs are canned.

LOBSTER. -- The canned lobster consumed in the United States is packed in Nova Scotia, New Brunswick and Newfoundland. The spiny lobster or rock lobster, a

crawfish; is packed in the West Indies and the Union of South Africa, and imported.

The color of canned lobster meat varies somewhat without affecting the taste. Pure white is regarded as the natural color, but the meat may have a grayish tinge which is just as natural. Meat of this color is perfectly good, the tinge being due to the fact that the lobster was caught while feeding on the muddy bottom.

Lobsters are packed in quarter, half, three-quarter, No. 1 flat, No. 1 picnic, and No. 1 tall cans having net weights of 3, 6, 9, 12, $7\frac{1}{2}$ and 16-ounces respectively. The cans are enamel-lined and further lined with vegetable parchment. Most of the pack is put up in quarter and half-flat cans. Breast, knuckle meat and liver are canned as lobster paste.

Lobster Newberg, packed in No. 300 size cans, contains pieces of lobster in a sauce made of cream thickened with eggs.

MUSSELS. - Shucked and packed in Maine in No. 1, No. 2 and No. 10 cans. The Atlantic mussel is the only species canned in the United States. It may be used in the same ways as canned clams. A pack is sometimes prepared in spiced vinegar or vinegar sauce.

"Pickled" or "jellied" mussels are usually packed in five and eight-ounce containers. Pickled or jellied mussels are not processed and depend entirely on the pickling cure and on low-storage temperature for preservation. Non-processed mussels, usually in glass containers, remain in good condition for two to four months, depending on the degree of skill used in preparation, and on the temperature of storage. The pack must be protected from light since the meats gradually darken if light rays are too strong. Storage at temperatures of 34° to 40° F., increases shelf life.

OYSTERS. - One of the first foods to be canned in this country. Canning of oysters is done in North and South Carolina, Louisiana, Mississippi, Alabama, on the east coast and the Gulf, and in Washington and Oregon on the west coast. Mississippi, Alabama, and Louisiana are the big producing states. Oysters are usually packed in No. 1 cans containing $7\frac{1}{2}$ ounces net weight of oyster meat. Smoked oysters, oyster cocktails, and smoked oyster spread are also packed.

Smoked oysters packed in "quarter oil" sardine cans have been imported for some years. However, a method of smoking and canning oysters has recently been developed by packers of Pacific oysters. Smoked oysters are a specialty product, and sold as an appetizer.

"Cold pack" oysters. Fresh oysters are packed in glass and in hermetically-sealed cans. These products should be kept under constant refrigeration at all times.

SHRIMP. - The packing industry is centered in the South Atlantic and the Gulf area. Recently small packs have been prepared in Maine and Alaska. Shrimp are precooked in boiling brine, dried, and packed in enamel-lined cans in No. 1 picnic size. The wet pack in the No. 1 can contains seven-ounces and the dry pack, $6\frac{1}{2}$ ounces. Most of the pack in recent years has been wet pack. Wet pack contains brine while the dry pack contains no liquor. Shrimp are also packed in glass in eight-ounce and nine-ounce sizes, and in a $2\frac{1}{2}$ -ounce/size.

Glass pack are very attractive as display, but should be kept out of the strong light.

The shrimp-canning industry has placed itself under a voluntary inspection system administered by the Seafood Inspection Service of the U. S. Food and Drug Administration. Government regulations require that shrimp be graded by size, with the following counts of shrimp to the No. 1 can: Jumbo, 24 and under; large, 25 to 35; medium, 36 to 56; small, 57 and over. There is no count on broken shrimp.

Cooked shrimp meat is packed in hermetically-sealed containers. It can be frozen at 5° F., and must be kept under refrigeration.

SQUID. - In the United States, squid are canned only in the Monterey Bay area of California. Small amounts are imported from Portugal and Spain. The pack has increased from an insignificant quantity in 1942 to more than 570,000 cases in 1946. They may be packed in "ink" or in "oil." If they are to be packed in "ink" they are simply washed thoroughly and not eviscerated; if in "oil," they are washed and dressed to remove sepia bag which secretes the "ink."

They are packed in No. 1 picnic, No. 1 tall or 300 and 1/2 tuna cans. Some are canned as "raw pack" which are washed, dressed, and packed into No. 1 picnic cans and exhausted in a steam box filled with hot light brine, and processed. The oil pack contains cottonseed oil.

TURTLE AND TERRAPIN. - Turtle and terrapin products are canned mostly in No. 1 picnic cans.

Green turtle soup is canned in New York and Key West, Florida, utilizing green turtles imported from Central America.

Snapping turtle soup. Two species of snapping turtle are canned, the common and the hard-shell or alligator turtle.

Snapping turtle stew. Snapper stew.

Terrapin stew. Canned from salt-water or diamond-back terrapin.

SEAFOOD COCKTAIL. - Packed in important fisheries centers on the Pacific coast. The varieties marketed are clam, oyster, crab and shrimp. Glass containers are used with a net capacity of four and six ounces. Each packer has his own formula for the sauce in which the product is preserved. Hermetically-sealed, they remain in good condition about 10 days, under ordinary conditions of merchandising. This may be increased to about 30 days if the temperature is held at 34° to 36° F. Exposure on shelves or on the top of show cases in bright light, hastens spoilage.

FROZEN FISHERY PRODUCTS

Quick-Frozen Foods

Quick-frozen foods or frosted foods, are expected to show an increase in importance in the next few years. Consumer interest in them grew rather slowly in the years before the war, but that interest increased rapidly

during the war when many consumers bought these foods for the first time because of the shortages of other lines. The supply is being held down by shortages of packaging facilities and up-to-date equipment for the stores and home storage.

Quick-frozen foods are those which are processed by freezing so rapidly that they hold their original appearance and flavor after defrosting. The speed with which these foods are frozen to rock-like hardness, usually from two to four hours, is the important factor in this form of processing. Because of this speed, there is not time for the formation of large ice crystals in the cells of the foods such as are formed in the older process of slow freezing or sharp freezing. In quick-freezing the ice crystals are kept so small that they do not puncture the walls of the cells. Foods processed while at the peak of perfection retain their fine, full flavor after defrosting.

Several methods of quick-freezing are employed. A temperature of about 25° below zero Fahrenheit, is used. After that, the foods are held at low temperature (below 5° F.) right up to the time they are placed in the hands of customers in the stores. An article in "Quick Frozen Foods" on Clarence Birdseye's experience, illustrates the story of quick-freezing. It seems that a fish was caught on a particularly cold day and after being caught was thrown on the ice where it froze solid almost instantly. Several days later the hard, frozen fish was dropped into a bucket of water to thaw. When "frying time" arrived, Mr. Birdseye returned to the bucket to find the fish swimming around unconcernedly. That fish, Mr. Birdseye claimed, was unusually delicious. Quick-freezing it alive had done nothing to harm its flavor. It was evident that the original tissues of the fish remained intact, which is not true in the case of fish frozen by slower processes. Theoretically, this is perfection in frozen fish processing.

Frozen food cabinets are becoming so widely distributed among various food stores that they have become commonplace in the shopper's experience. Satisfactory sales volume depends, to a considerable degree, on the way the frozen foods are packed, displayed, and handled. Many cabinets are overcrowded, thus making it difficult for the customer to find the item desired. This discourages the customer from buying. Packages in the cabinets should be kept well-arranged, with prices conspicuously marked on each item. In this way, maximum sales can be obtained.

New types of frozen food cases enable customers to reach the packaged foods easily. They encourage self-service. Stores equipped with the old style cases with covers, have made it a practice to leave cases open during busy periods. This is not considered good general practice as it allows the foods to thaw. Frozen foods should be placed in the cabinets as soon as they are received from the distributor if other adequate storage is not available.

Precooked frozen foods are a recent addition, with some main-course dishes complete with fish or meat, potatoes, and vegetables, now receiving merchandising emphasis. Many new items may be expected on the market due to experimentation by an ever-increasing list of frozen food manufacturers.

Fish need not be thawed before cooking. However, additional cooking time should be allowed to thoroughly cook the product as compared with defrosted fish. Those which are not cooked before serving should be defrosted slowly.

Interest in packaging of food products will be intensified in 1947. Many retail food-store operators and some wholesalers and shippers have been carrying on experimental operations in this field. Shortages of materials and equipment have interfered with the rapid introduction of most new merchandising developments during the past few years. Easing of these shortages will permit adoption of proved practices.

Supply Situation

Production of frozen foods during the war years was tremendous, but a great part of the pack went to the Government. This potential is now available for civilian consumption.

During 1946, the production of frozen fish and shellfish in public freezers totaled more than 280 million pounds. While these figures are for the total commercial production in public freezers, private freezers, in addition, froze a considerable volume. Fillets and steaks in consumer-size packages represent a small but ever-increasing proportion of the total.

Frozen Fish

COD. - Packed on the Atlantic coast as fillets, steaks, cheek meat. Called true-cod on the Pacific coast where it is packed as fillets. Lean, flaky and white-meated.

CUSK. - Packed as fillets and steaks. Has lean, white flesh with a mild flavor. A New England product.

FLOUNDER. - Sometimes referred to as "sole." Many different species are caught in the Atlantic and Pacific. Lean, thin-bodied to thick, soft meat to firm and flaky, with white meat, they have a sweet and rich flavor. Prepared as fillets.

HADDOCK. - Packed as fillets. A New England product. Lean, firm and white-meated, flaky, with a mild flavor. They are distinguished by black lateral line on the skin.

HAKE. - Fillets packed in New England. Lean, soft-meated, mild flavor.

HALIBUT. - Packed as fillets and steaks. Lean, white meat, firm and flaky. A Pacific coast product.

HERRING, LAKE. - Fillets are packed in the Great Lakes area. Some packed headed, scaled and eviscerated. Sometimes called cisco or bluefin. White and tender-meated, lean to fat, rich flavor.

LINGCOD. - Packed on the Pacific coast as steaks and fillets. Lean, firm and flaky, rich in flavor.

MACKEREL. - Packed on the Atlantic coast as fillots. Fat, firm and with dark flesh. Rich flavored.

PIKE. - Filleted, packed in the Great Lakes area and Canada, from blue, sauger, and yellow pike. Lean, firm and white-meated, fine flavor.

POLLOCK. - Packed as steaks and fillets. Lean, white-meated and firm, mild flavor. A New England product.

ROCKFISH. - Packed as fillets from many species of rockfishes. Lean, firm flesh, good flavor. Caught in the Pacific.

ROSEFISH. - Packed as fillets, they are a New England product. Lean, white and firm-meated, rich-flavored. Distinguished by orange or red-colored skin. Also called "redfish" or "ocean perch." One of the most abundant products.

SALMON. - Packed as steaks and fillets. Varying in color from red to pink-white, depending upon species. Mainly from the Pacific area although there is a small catch in the Atlantic. Firm and flaky, rich-flavored.

SWORDFISH. - Packed as steaks, from the Atlantic and Pacific. Some imported. Lean, firm, flaky. Rich distinctive flavor.

SABLEFISH. - Filleted, caught in the Pacific. Fat, white-meated, firm and flaky, with rich flavor.

SHAD ROE. - Selected roe from shad.

WHITING. - Filleted and pan-dressed; packed in New England; lean, white and soft-meated, with mild flavor. Sometimes called silver hake.

YELLOW PERCH. - Filleted, packed in the Great Lakes area. Lean, firm and white-meated, with fine flavor.

ANIMAL FOOD. - Frozen fish for cat food. Packed in New England.

Frozen Shellfish, etc.

CLAMS (SHUCKED). - Ready to cook or serve. From the Atlantic and Pacific; lean. Hard clams have firmer texture and richer flavor than soft clams. Entire contents edible.

CRAB MEAT. - The dungeness crab, caught off the Pacific coast, is frozen. Blue and rock crab are used on the Atlantic coast. Lean, white, sweet, tender and flaky.

FROG LEGS. - Skinned, cleaned and ready for the pan. Graded by size, and wrapped in parchment. Thick-meated and plump. Lean, white and sweet-meated, rich flavor.

LOBSTER MEAT. - The common lobster caught in North Atlantic waters. Selected live lobsters are steam-cooked, and the meat is picked from the shell. Ready to use. One style of pack contains meat from tails and claws only. Lean, white, firm and sweet meated.

LOBSTER TAILS. - Packed from rock lobster or sea crawfish. Commonly called spiny lobster. Lean, white-meated, sweet. Tail portion only used.

OYSTERS. - Fresh shucked, washed in brine and frozen ready to cook or serve. Caught in the Atlantic and Pacific. Lean, rich, distinctive flavor and texture. Entire contents are edible.

SCALLOPS (SHUCKED). - There are two species, bay and sea scallops. Bay are smaller; sea are larger. Lean, white and firm-meated, sweet flavor. Bay scallops, about 40 to the pound; sea scallops about 10 to 15 to the pound. Packed principally in New England and the Middle Atlantic areas.

SHRIMP. - Cleaned, frozen uncooked, and cooked. Caught in the Atlantic, Gulf and Pacific areas. Range from 15 to 60 to the pound; lean, white-meated and firm, sweet flavor, edible portion is the body and tail.

SQUID. - Lean, firm, sweet-meated.

TURTLE. - Steaks and meats. Rich flavor, firm texture.

Frozen Cooked Seafood

CODFISH CAKES. - Codfish, potatoes and seasoning.

FISH CAKES. - Fish, Potatoes and seasoning. Prepared from cod, haddock, cusk or pollock.

CREAMED SALMON. - Salmon, white sauce and seasoning.

CREAMED TUNA. - Tuna, white sauce and seasoning.

FISH LOAF. - Fish, filler, binder and seasoning.

FISH IN ASPIC. - Fish, gelatin and seasoning.

FISH DINNER. - Fish, Creole sauce, and seasoning; vegetables.

DEVILED CRABS. - Crab meat, white sauce and seasoning.

OYSTER NEWBERG. - Oysters, cream and seasoning.

OYSTER STEW. - Oysters, milk and seasoning.

SHRIMP STEW. - Shrimp, milk and seasoning.

SHRIMP GUMBO. - Shrimp, sauce and seasoning.

SEAFOOD A LA QUEEN. - Seafood, sauce and seasoning.

SHRIMP A LA KING. - Shrimp, white sauce and seasoning.

SHRIMP SANDWICH SPREAD. - Shrimp, dressing and seasoning.

HORS D'OEUVRES. - Fish and Shellfish, hors d'oeuvres.