Preservation of Seafoods

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Station Circular 164 July 1944

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FOREWORD

Commercial fishing has long been one of the more important industries in Oregon. The salmon of Oregon's rivers has been the species most extensively used. More recently, tuna has become a large and important fishery. And now the rock and bottom fishes are coming into the foreground. Then, too, some other little-known seafoods products have been used for human consumption. As the science of food technology progresses, Oregon will move forward in the field of commercial seafood processing to make it one of the leading industries of the Northwest.

The purpose of the Seafoods Laboratory is to study means of improving present methods of marine foods preservation and to derive new foodstuffs from such sources. This bulletin has been written as a result of some of this work and is now published with the express purpose of aiding our national emergency.

WM. A. SCHOENFELD
Dean and Director

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By

EDWARD W. HARVEY*

PROCEDURES for the preservation of some seafood products are discussed in this bulletin. These procedures combine both old and new information for all producers of such products.

These methods have been worked on in the Seafoods Laboratory† at Astoria, for varying periods before and since the war. They are published at this time because of the need of protein foodstuffs in the present emergency. Some methods will necessarily need to be changed to suit certain conditions in the plant or home. The plan or principle of a given procedure, however, is to be followed to give satisfactory results.

As in the case of any method of foods preservation, seafood products must be of good quality to begin an operation. Inferior quality at the start can mean only an inferior finished product. The wise producer will see to it that he receives his fish or other marine products in good condition, and that his plant operational plan is set up in such a manner as to produce the finished product most efficiently. Straight-line operation and rapidity of handling and processing are important factors in the production of fishery products. To the new processor it is suggested, therefore, that the detail of operation and handling be given consideration before he starts to work.

CLAMS

(RAZOR, STEAMER)

Canning clams

1. Steamer clams are scrubbed with a brush if necessary and then allowed to stand 2 to 3 hours in fresh salt brine (3 per cent) ($3\frac{3}{4}$ oz. salt per gallon of water) to clean themselves. Razor clams do not need such treatment. They clean readily after opening by being washed thoroughly in plenty of fresh water.
2. Opening clams is done by one of two methods:
   a. Clams may be put into a steaming container in which a clam liquor catching pan has been placed, and steamed open during a 1 to 5 minute period.

* *Acknowledgment.* The author expresses appreciation for the assistance given by the various fisheries industries on the Columbia River, the Clatsop County Court, the American Can Company, the Fish Commission of Oregon and others who have aided this work.

† A branch of Food Industries Department, Oregon Agricultural Experiment Station, Corvallis.

b. Clams may be opened (shucked) raw, if the juice or liquor from them is saved. (This latter method of opening is preferable if time permits, because the appearance and flavor of clams so opened are better.) As the clams are opened and removed from the shell, the stomach or dark mass is opened and its contents completely removed.

3. Wash all clam meats thoroughly in fresh water or a weak brine (2½ oz. salt per gallon of water). The neck or siphon and the stomach are to be cleaned with care. Slit lengthwise to clean.

NOTE— Thorough cleaning prevents the possibility of mussel-poisoning.

4. Optional: Dipping or immersing the meats in a boiling citric acid bath will improve the pack in color and flavor. Use ½ teaspoonful citric acid crystals (obtained in drugstore or chemical supply house) per gallon of water.
5. Grind clam meats or leave whole as desired.
6. Pack into C-enamel cans or glass jars, leaving ⅜ to 1 inch space at the top of container. (See Table 1.)
7. Add ½ to ¾ teaspoonful of salt per container or to suit taste.
8. Cover meat with hot clam liquor and/or hot water to within ¼ to ⅝ inch of top of container.
9. Seal containers immediately.
10. Process at 240° F. (10 lb. pressure).

Table 1. PROCESSING TIME FOR CLAMS.*

	8 oz. tin	1 lb. tin	½ pt. jar	1 pt. jar
Whole clams.....	60 min.	70 min.	70 min.	80 min.
Minced or ground..	60 min.	70 min.	70 min.	90 min.

* Note: 6 oz. or ¾ cup ground clam to a ½ pt. jar. 12 oz. or 1½ cups ground clam to a pint jar or No. 2 can.

Freezing clams

1. The sand or dirt may be removed by hosing, holding under a faucet, or brushing. Steamer clams should be allowed to stand in fresh water or a weak brine (3 per cent) (3¾ oz. salt per gallon of water) for 2 to 3 hours to void themselves of some internal sand and dirt. Razor clams may be washed free of sand or other foreign material by carefully washing the meats in fresh water.
2. Clams may be opened by one of three methods:
   a. Open raw with knife.
   b. Steam open by subjecting to live steam for 2 to 3 minutes.
   c. Dip in hot water for 3 minutes.

Note—Shell fish poisoning in clams and mussels has been of rare occurrence in Oregon but a safe rule is: *Do not eat the viscera (dark meat), nor siphons (necks), nor drink the juice from mussels or clams taken from ocean beaches between May 1 and October 31,* unless State Health Authorities have certified the poison as being absent in clams and mussels.

3. The neck, or siphon, and the stomach are slit open lengthwise so that both may be freed of their contents. *All* dark material in the stomach is to be removed. (This step may be done in combination with step 1.)
4. Drain off excess wash water or brine for a few minutes.
5. Pack in cellophane-lined cartons, waxed cartons, wax-impregnated cartons, glass, or slip-top can.
6. Cover meat with clam liquor, or a 3 per cent brine ($3\frac{3}{4}$ oz. salt per gallon of water) leaving a headspace for expansion ($\frac{1}{4}$ to $\frac{1}{2}$ inch).
7. Heat seal or otherwise close and seal the containers being used, excluding as much air as possible.
8. Freeze at 0° F. and store at 0° F.

CRABS

(DUNGENESS)

Canning crabmeat

The Dungeness crab (Cancer magister) is found abundantly in Oregon's coastal waters. The crab season is long-lasting and offers canning material for many months of the year.

There are two major difficulties encountered in canning crab. Both of these difficulties are due to discolorations. The first is a natural discoloration caused by a very slight chemical change in one of the tissues of the crab. It is a harmless change usually occurring most evidently on the sides of the larger leg muscles. It is varying in degree from a light shadowy effect to a slate-grey color. Even though it is a harmless change, it does impair the appearance of the canned product and thus it is desirable to prevent it.

The other discoloration is one due to a combination of factors—namely, improper treatment of the meat, poor temperature control, and poor range in retort operation. This latter discoloration manifests itself in the form of dulled, browned meat, the red pigment on the leg muscles being darkened or browned.

An improved method of precooking crabs for canning has been derived, tested, and put into practice commercially. This newer method of precooking is easier, causes less delay in operations, and also produces a far better meat than that formerly obtained when whole or partly cleaned crabs were boiled in fresh or salt water for 20 to 30 minutes.

The procedure that will minimize discolorations and utilize the precooking method is given on the following page.

1. Use only live crabs.
2. While alive, remove carapace (back shell) by pulling from one side. The operator holds the crab, mouth down, by grasping the left legs and holding the crab on the table or against his abdomen. Then with the right hand on the left edge of the carapace, he pulls out or away. Crabs may be cut in half by means of a heavy blade and then cleaned. Iced or chilled crabs will be less active.
3. Eviscerate and wash. The body contents are easily shaken and/or washed out by a small fast stream of water. The gills are removed by hand. Newly forming shell, which is jelly-like and contains some pigment, is best removed; if not removed, this pigment may discolor the body meat. The crabs are now broken in half, ready for the precook.
4. The crabs are put into a suitable container and subjected to a good flow or source of live steam at 212° to 214° F. Place crabs in container in retort or pressure cooker above water. Allow an ample flow of steam to escape from vents (petcock). (A small amount of entrapped air will prevent attainment of the desired temperature.) After the air has been driven from the retort and a steady flow of steam from the vent has been obtained, cook the crabs for 12 to 15 minutes.
5. After this cook, remove from retort and, as soon as the pickers can handle the crabs, start the picking. A small amount of cold water may be used to cool a few to start the picking, but it is better if the meat does not come into contact with water.
6. The halves are grasped by the legs. The body sections (thin white cartilaginous structures) are cracked and slightly crushed by hand so as to free the body muscle attachments. The halves are then shaken, shaking the body meat into a pan. The picker often strikes the rim of the pan with the body to remove some of the meat that may remain within these sections. The legs are cracked along the outer curved edges only enough to allow shell removal. The segments are removed from the legs by starting with those farthest from the body, thus pulling out the cartilaginous sheath to which the muscle of the next segment is attached. Usually the smaller segments do not contain enough meat to justify their being cracked and opened. Keep leg and body meat separate to facilitate packing. Work on batches of crabs so that the remaining heat will aid the removal of the meat.
7. The meat, both leg and body, is dipped in a 5 per cent salt brine (6.4 oz. salt per gallon of water) containing 1 oz. of citric acid

per gallon. The meat is subjected to this dip for 1 to 2 minutes with enough agitation, usually by hand, to insure complete contact of the acid-brine to all pieces. The meat is allowed to drain, the excess moisture being expressed by hand.

8. The meat is closely packed in C-enamel tins (or in glass jars) with or without parchment. A parchment disk to separate pigmented and nonpigmented meat will prevent diffusion of the red into the body meat and consequently give a better appearing pack. Use 6 to 6½ oz. (¾ cup) meat per 8 oz. can or ½ pt. jar.

9. A. Commercial method: Seal in vacuum or exhaust 10 minutes at 212° F. and process ½-pound tins at 250° F. (15 lb. pressure) for 30 minutes. The tins should be water-cooled as soon as possible.

   B. Domestic method: Partly seal jars and process at 225° F. (5 lb. pressure), ½ pt. jars, 80 minutes; pint jars, 90 minutes. Complete seal and air cool.

PRECAUTIONS TO BE OBSERVED

Do not allow the meat to come into contact with copper or iron, as these metals intensify the slate-grey discoloration. Aluminum, galvanized, and enamel ware are satisfactory utensils.

The acid brine used for dipping the meat cannot be used for too long a period because the acid will be taken up gradually by the meat and therefore cannot have its effect in allaying discoloration.

Do not use the meat of dead crabs and do not allow meat to stand long prior to packing.

Rapidity of handling is important.

Freezing crabmeat

Follow steps 1 through 6 as given in the foregoing crab canning procedure.

7. Pack meat in suitable container for freezing. Glass, waxed cups, cellophane-lined cups, or cellophane-lined cartons may be used.
8. Cover meat with a 2 per cent brine (2½ oz. or 3 level teaspoonfuls of salt per gallon of water), leaving headspace for expansion. Cover tightly, heat seal, or otherwise close the container. (The brine addition may be omitted if the crabmeat is to be used within a 4-month storage period.)
9. Freeze at —10° to —20° F. if such temperatures are available. If freezing is to be done at 0° F., allow ample spacing of con-

tainers for circulation of air until packages are frozen. Store at 0° F. or below.

OYSTERS

(PACIFIC)

Freezing oysters

Oysters are more susceptible to various types of spoilage than some of the other marine foods. Oysters must be handled with care and as rapidly as possible. It is suggested that the operator have well in mind the various steps in handling, and the equipment and supplies needed before starting to shuck oysters preparatory to freezing them.

1. Use only live oysters.
2. Hose off to remove external debris from the shell.
3. Shuck or open raw in usual manner, saving oyster liquor.
4. Wash thoroughly in a 2.6 per cent brine (3½ to 4 tablespoonfuls of salt per gallon of water). (This is a 10° salometer brine.) Do *not* leave oysters in brine longer than necessary (8 to 10 minutes).
5. Allow excess water or brine to drain from meats.
6. Package:
   1. Cellophane-lined box or carton.
   2. Cans, C-enamel.
   3. Glass jars.
   4. Waxed containers, heavy.
7. Cover surface with oyster liquor or 10° brine to prevent exposure to air. Allow for expansion.
8. Seal or close container.
9. Freeze as soon and as fast as possible. If temperatures lower than 0° F. are available, they should be used.
10. Store at 0° F.

Canning oysters

1. Wash the oysters by hosing to free of mud, dirt, and other loose material.
2. Shuck by knife, or open by subjecting to steam as follows: Place oysters in baskets or trays and steam them in retort or pressure cooker for 5 to 7 minutes at 240° F. (10 lb. pressure), or until shells open.

3. Shuck meats into water or a brine to prevent the action of air upon the meats. A 2.5 to 3.0 per cent brine is used to protect the meats in this step. (3.2 to 3.8 oz. or 3¼ to 4 tablespoonfuls of salt per gallon of water.)
4. Agitate by stirring and wash meats in this brine. Remove darkened, or otherwise discolored, oysters. Remove by screen, basket, or perforated container.
5. Allow to drain about 3 to 5 minutes.
6. Pack as quickly as possible to prevent discoloration. Use C-enamel or plain cans, or glass jars. Care should be exercised in this operation because of the weight change that occurs in oyster meats when retorted. Allow ½- to 1-inch space at top of container (depending on size being used) for change during processing.
7. Add 3 per cent brine and vacuum seal, or add sufficient hot 3 per cent brine (see step 3 above) to cover meats and exhaust cans with loosely crimped lids for 8 to 10 minutes at 212° F. Complete seal. If glass jars are used, place covers on loosely and exhaust in same manner.
8. Process at 240° F. (10 lb. pressure) as follows:

½ pt. jar	45 minutes
No. 1 tall tins	45 minutes
No. 2 tins	60 minutes
1 pint jars	60 minutes

9. If cans are used, release retort pressure, remove, and water-cool the cans. If glass jars are used, remove from heat source and allow pressure to come down naturally. Remove jars and air-cool them well before storing.

Kippering oysters

1. Use live oysters of good quality.
2. Wash shells by hosing to remove mud and other loose materials.
3. Oysters may be shucked or opened raw, but operations may be hastened if they are opened by the following method:
   a. Place washed oysters in basket, metal or wood, and put into pressure cooker or retort.
   b. Steam at 10 lb. pressure for approximately 15 to 20 minutes to open and remove some moisture.
   c. Release pressure gradually.
   d. Remove basket as soon as possible.

e. Remove meats from shells by knife, taking care to cut abductor muscle or *eye* from shell.

4. Place meats in an 8 per cent brine (10¼ oz. salt per gallon of water) solution to wash. Agitate gently to loosen all dirt. *Do not* leave meats in this washing brine longer than 8 or 9 minutes, because a bitter flavor may develop by so doing. Give meats a quick cold water dip or rinse.
5. Place oyster meats separately on *oiled* metal mesh trays. (Use any suitable bland oil for this purpose.)
6. Allow trays of meats to drain for 3 to 5 minutes and then place them in the smoking chamber, which has been preheated by a moderate fire to 120° to 130° F.
7. Maintain the temperature range of 120° to 140° F. for 3 to 4 hours. If meats are not as brown as desired, the temperature may be raised to 160° to 165° F. for 10 to 15 minutes to achieve the color desired.
8. Remove the trays of meats from the smoking chamber and allow to cool.
9. The oysters may be used as they come from the trays but since they will not keep indefinitely, it is recommended that they be canned as follows:
   a. Pack meats to fill in No. 32 (tuna) enamel cans, or 8 oz. glass jars.
   b. Add 1 to 1½ oz. cottonseed, soya, or other suitable oil, as desired.
   c. Vacuum seal, or exhaust with lids on for 12 minutes at 212° F.; seal.
   d. Process 8 oz. containers 60 minutes at 240° F. Complete jar seal.
   e. Water-cool tins. Air-cool glass jars.

SMELT

Ground or loaf smelt

A good source of protein foodstuff is found in the spring runs of smelt. This fish, however, is one that is susceptible to spoilage of one form or another in both fresh and frozen methods of handling and storing. A new means of conserving this foodstuff has been derived and is given in the following commercial procedure.

Carp, sucker, and shad may be handled similarly.

1. Wash whole fish to remove external debris.

2. Remove head in such a manner as to remove heart. Knife, rotating blade, or scissors may be employed.
3. Eviscerate after slitting belly wall.
4. Wash well by spray and/or agitation tank washing.
5. Precook on metal mesh (4 per inch) trays in thin layers at 212° F. for 10 to 15 minutes.
6. Grind through $\frac{3}{8}$-inch to $\frac{1}{2}$-inch plate into perforated containers to allow escape of moisture.
7. Fill No. 1 tall (300 x 407) cans to give a net content of not less than 15 oz.
8. Exhaust 25 minutes at 212° F. or vacuum seal.
9. Process 90 minutes at 250° F.

TUNA

(ALBACORE)

Canning tuna

Fresh or frozen tuna may be used for canning purposes. If frozen fish is to be used, however, ample time for thawing must be allowed.

1. Clean fish well. Remove viscera or entrails. Wash. Allow blood from the stomach cavity to drain.
2. Place fish, gut cavity down, on metal mesh tray or perforated pan.
3. Place tray with fish in a steaming chamber or preferably a retort (pressure cooker). Do not allow to rest on bottom of container.
4. Precook fresh tuna at 216° to 218° F. (2 lb. pressure) for $2\frac{3}{4}$ to 4 hours, depending on size of fish. Precook thawed tuna at 216° to 218° F. for $2\frac{1}{2}$ to $3\frac{1}{2}$ hours, depending on size of fish. If steam at 212° F. is used, add $\frac{1}{2}$ to 1 hour to foregoing cooking time.
5. Allow to cool to room temperature. Then store overnight, or 12 to 24 hours in a cool room. (If available use refrigerator temperatures.)
6. Remove fish from cool room and peel off skin with knife, lightly scraping surface to remove blood vessels.
7. Separate meat into four quarters by first breaking apart the two halves from back to belly, removing backbone, and then separating each of these halves into the quarters. Pull off and cut out all bones and fin bases.

8. Scrape and cut out all dark brown flesh, leaving four cleaned, all-white meat sections.
9. Cut sections crosswise in lengths suitable for packing in container to be used in canning. Allow ¾- to 1¼-inch space at top of cans or jars.
10. Fit cut pieces into cans (tuna enamel or C-enamel) or jars. Press down gently to effect a solid pack.
11. Add salt and oil to each container. Cottonseed, soya, or other vegetable oil is to be used. If oil is not available water may be substituted, or a pack can be made using half oil and half water. When water is added, C-enamel cans or glass jars are used.
12. a. Vacuum seal *or*
    b. Exhaust or steam containers for 10 to 12 minutes at 212° F. with covers or lids on.
13. Seal cans, or partly seal glass, and process. Complete seal on jars after process.
14. Cool before storing.

Table 2. CANNING TUNA.

	Salt	Oil	Water	Oil and water	Process 240° F. 10 pounds pressure
8 oz. can	½ tsp.	1-1¼ oz. (3 tbsp.)	Same as oil	Same—equal parts	75 minutes
1 lb. can	1 tsp.	2-2½ oz. (5 tbsp.)	Same as oil	Same—equal parts	100 minutes
½ pint jar	⅝ tsp.	1½-2 oz. (4 tbsp.)	Same as oil	Same—equal parts	90 minutes
1 pint jar	1¼ tsp.	2½-3 oz. (5-6 tbsp.)	Same as oil	Same—equal parts	100 minutes

Canning of dark-and-light-meat tuna

As the white muscle sections are prepared in the regular tuna canning procedure, considerable dark-and-light-meat tuna is obtained. This meat has not been used in the past except in a very few instances, and has been considered a waste or byproduct going into fish meal. This combination of meats can be commercially packed with a good degree of success by the following procedure, thus providing an added source of protein for loaf, sandwich filling, and other foodstuff preparations.

1. Pick over the mixture of light and dark meat to remove bones and any other waste material. Pack with oil and salt additions as shown in Table 2, *or*
2. Grind the meat through a ¼- or ⅜-inch plate.

3. Add to the ground meat 3.0 to 3.5 gms. salt ($\frac{1}{2}$ teaspoonful) per 8 oz. of meat, mixing thoroughly to insure an even distribution of salt.
4. Pack firmly 8 to 8$\frac{1}{4}$ oz. of ground meat per 8 oz. flat tuna enamelled can.
5. Add 5 to 7 cc of cottonseed, soya, or other bland vegetable oil per can. The oil addition may be omitted, or increased.
6. Vacuum seal.
7. Process 8 oz. flat cans 80 minutes at 240° F. (10 lb. pressure).

SALMON

Kippering salmon

1. Dress and clean fish well.
2. Fillet.
3. Cutting the fillets into 3 to 4 inch pieces is advantageous at this time for later storage purposes.
4. Allow pieces of fish to stand in a brine overnight (7 to 8 oz. of salt per gallon of water) or 14 to 18 hours.
5. Rinse well in cold water.
6. Place pieces on wire mesh trays, skin down, leaving space between pieces. Place trays in smoking chamber.
7. Smoke for 40 to 48 hours at 70° to 80° F. Never use more than 90° F.
8. Raise heat by building up fire to 165° to 170° F. for 45 to 50 minutes to cook fish and obtain appetizing brown color.
9. Open doors to smoking room to release heat and remove trays to cool fish. Kippered fish thus prepared must be kept under refrigeration, or canned. If kept under refrigeration it will store for a period of 3 to 5 weeks. If it is to be canned, follow the given procedure:
   a. Cut into pieces suitable to the containers being used. Pack.
   b. Exhaust or heat with lids or covers on containers for 12 minutes at 212° F.
   c. Seal containers immediately, *or*
   d. Vacuum seal (instead of *b* and *c*).

e. Process as follows:

8 oz. plain tin.....60 minutes at 240° F. (10 lb. pressure) if no bones are present

½ pt. jar.....60 minutes at 240° F. if no bones are present

To cook bone process 90 minutes.

Smoking salmon

1. Dress and clean fish well.
2. Fillet (remove backbone lengthwise).
3. Puncture skin along middle of side or fat line, and place on layer of salt in wooden tub or keg, crock, or other suitable container. Cover fillets with dry salt and allow to stand in cold room overnight.
4. Remove excess dry salt. *Cover* with a strong salt solution (28 oz. salt per gallon of water).
5. Allow to stand in cold room (refrigerator) for 10 to 14 days or in cool storage room for 4 to 6 days.
6. Remove from brine and soak in fresh water for 20 to 30 minutes.
7. Place fillets, skin down, on trays in smokehouse 10 or more feet above fire.
8. Smoke with crab apple, vine maple, or alder at temperatures below 80° F. The sawdust of these woods is recommended as an aid in obtaining a good smoke and as an aid in keeping this temperature. This smoking should be continued for 5 to 10 days, or until such time as the operator attains the degree of smoke desired and knows that enough moisture has been withdrawn from the flesh to provide good keeping quality.

Kippering salmon cheeks

1. Remove cheeks from salmon heads.
2. Allow to stand covered in a 3 per cent brine (3.8 oz. salt per gallon of water) overnight in a cool room.
3. Remove from brine and soak in fresh cold water for 20 minutes. Remove and drain.
4. Place salmon cheeks on oiled (vegetable oil) screen trays (¼ to ½ inch).
5. Place trays in preheated smoking chamber.

6. Smoke with vine maple, crab apple, or alder by one of these two methods:
   a. One hour at 160° to 180° F.
   b. Six hours at 70° to 80° F. with a hot fire (180° F.) for 30 to 40 minutes to brown the cheeks.
7. Remove trays to cool.
8. The salmon cheeks are now ready for use. If it is desired to store some of them for a period of several months they must be canned according to the method given under the procedure for kippered salmon.

SOUP-FIN SHARK

Kippering soup-fin shark

Soup-fin shark (and other elasmobranch) flesh is more susceptible to spoilage than the flesh of other species of fish. Careful and rapid handling is therefore of considerable importance in any method of preservation of this group.

As soup-fin shark flesh is now used in large quantities in the fresh and frozen fish markets, other methods of preservation of this fish flesh have been considered. A kippered soup-fin shark procedure has been developed, and is given as follows:

1. Dress and clean fish in usual manner, cutting away the belly wall (soft portion).
2. Fillet the fish by removing skin and backbone (cartilaginous-bony structure).
3. Cut across fillets to make pieces that will fit the containers to be used.
4. Put pieces of flesh into an acid brine that has been prepared in advance. The brine is composed of 2.5 per cent salt solution (3.2 ounces salt per gallon of water) containing 0.2 per cent citric acid (0.25 ounce citric acid crystals per gallon water). The salt and acid concentrations may be varied to suit individual tastes. The salt may vary between 1.5 and 3.5 per cent. The acid may vary between 0.1 and 0.3 per cent; the recommended concentrations, however, were more suitable to a panel of persons tasting. Allow the fish to stand in the acid-brine for approximately 14 to 16 hours (overnight) in a cool room.
5. Remove meat from acid-brine. Soak briefly in fresh water (10 to 15 min.). Drain off free-run water.

6. Place pieces of meat on trays and put the trays into the kippering or smoking chamber. Cold smoke at temperatures of 75° to 85° F. for a day (8 to 10 hr.). Raise heat to 165° to 170° F. to brown the flesh for about three-quarters of an hour. Release heat and smoke from the chamber and remove trays.
7. Choosing pieces to fit, fill containers to be used (8 oz. plain or enamelled (tuna) tins, or ½ pint glass jars).
8. A bland vegetable oil (cottonseed, soya, other suitable oil) is added to each container in amounts varying from ½ to 1 ounce (2 to 4 teaspoonfuls). A dry pack may be made omitting the oil addition. Added oil, however, improves flavor, texture, and color of the product.
9. Vacuum seal, or exhaust and seal container. Do not seal glass jars.
10. Process at 240° F.
    8 oz. containers (tin or ½ pint glass).....70 minutes
11. Water-cool tins. Air-cool glass.

REFERENCE

Processes for Non-Acid Canned Foods in Metal Containers, Bulletin 26-L, National Canners' Association Research Laboratory, Fourth Edition. April 1939.