

OBSERVATIONS ON THE HERRING FISHERIES OF ENGLAND, SCOTLAND, AND HOLLAND.

By HUGH M. SMITH.

The herring (*Clupea harengus*) has justly been called the "king of fishes." Although its importance is now relatively less than it was several centuries ago, it is to-day a leading fish in the United States, Canada, Newfoundland, England, Scotland, Ireland, Holland, France, Norway, Sweden, and Russia. A species very similar to that of the Atlantic Ocean is found in the North Pacific Ocean, and is caught in large quantities in Japan and Alaska. In point of number of individual fish taken for market, no species exceeds the herring. The annual value of the herring fisheries is about \$25,250,000, representing 1,500,000,000 pounds of fish.

In 1900 the writer visited the principal herring-fishing centers of England, Scotland, and Holland. The following notes, based on the observations then made and the information there collected, are presented chiefly because of the large consumption of European herrings in the United States and because of the desirability of applying the foreign fishing and preserving methods to the herring industry on our east and west coasts. No attempt is made herein to furnish a complete account of the herring fisheries of the countries mentioned.

The writer was very courteously assisted in his inquiries by the following persons, to whom special acknowledgments are due: Mr. Charles E. Fryer, London, one of the three Government inspectors having jurisdiction over the fisheries of England and Wales; Mr. W. C. Robertson, Edinburgh, secretary of the fishery board for Scotland; Mr. J. R. Nutman, of Great Yarmouth, England; Mr. James Ingram, Government fishery officer, Aberdeen, Scotland; Mr. E. A. Man, United States consular agent at Schiedam, Holland, and Messrs. C. Van der Burg & Son, Vlaardingien, Holland.

Although the capture of herring is already one of the leading fisheries of the United States, the writer believes that the industry may be increased and the trade made more profitable by the adoption of foreign methods with a view (1) to supply from local fisheries the very large quantities of pickled herring now imported from Europe and Canada, and (2) to open a large trade with southern Europe and other regions.

The following letter from Mr. F. F. Dimick, secretary of the Boston Fish Bureau, dated April 7, 1900, is pertinent to this subject:

The herring imported from Norway, Holland, and Scotland are of a different quality from the herring found on our coast. They are fatter, and great care is taken of the fish when caught and in packing them. The herring caught on our coast of the same size are not so fat. Our fishermen generally find a good demand for their herring at from \$1.50 to \$3.50 per barrel fresh for

bait for the cod and haddock fisherman. The packers generally receive from \$3 to \$4.50 per barrel for United States shore herring, and there is generally not enough to supply the demand. The foreign herrings are consumed principally by foreigners, and sell at from \$8 to \$14 per barrel.

The quantities of pickled herring imported into the United States in 1900 from the countries stated were as follows:

Countries.	Smoked.		Pickled.	
	Pounds.	Value.	Pounds.	Value.
United Kingdom	299,322	\$12,043	8,960,272	\$375,586
Holland	69,123	3,661	12,191,897	674,665

THE ENGLISH AND SCOTCH HERRING FISHERIES.

GENERAL NOTES.

Grimsby and Yarmouth, the important English fishing centers on the shore of the North Sea, are extensively engaged in the herring fishery. At Grimsby the herring fishery is overshadowed by the beam-trawl fishery for bottom fish, but at Yarmouth the herring fishery predominates. The great herring markets of Scotland are Aberdeen, Fraserborough, and Peterhead, also on the North Sea. While these notes are based primarily on visits to Yarmouth and Aberdeen, supplementary information was gathered in London, Edinburgh, and other places. Although the same general methods are adopted in the herring industry in different parts of each country, it must be remembered that the accompanying notes are especially applicable to the particular places mentioned.

The principal fishing season at Yarmouth is from some time in October to the last of December. A few fish are caught earlier in special nets; these are small, well-flavored fish known as "longshore herring," and are for local consumption. There is also a spring fishery, involving most of the month of March and lasting five or six weeks. The fish then caught are small and poor, and are used for bait in the line fisheries.

The Yarmouth herring fishing is carried on with sailing vessels called luggers, and also by steamers. The use of the latter is increasing, 50 to 70 being operated in 1900. The crew of each kind of vessel consists of 11 men. Each vessel carries 200 gill nets, 30 yards long, 20 yards (or 260 meshes) deep, and costing £2 apiece. The number of meshes to a yard is from 28 to 31, the average size of mesh, bar measure, being equal to a shilling. The nets are cotton, machine-made, and, with proper care, may last seven years. They are first tanned with a solution of hot "kutch" or catechu from Burma, which is said to be better for this purpose than tan bark. After drying they are thoroughly soaked in linseed oil, and again dried by spreading on the ground. Oiling is done only once, but soaking in the astringent solution is repeated from time to time.

The entire complement of nets is shot at one time, the nets being tied together. A duplicate set of nets is held in reserve. The water is thick for 15 or 20 miles off Yarmouth, and fishing may be done at any hour of the day or night, but the best times are about sunrise and sunset. The herring do not remain long in the nets unless storms prevent hauling. Some vessels run fish in fresh, others dry-salt their

catch at sea, and store it in the hold in compartments. A vessel may leave port, set nets, make a catch, and be back the same day, or it may be out two weeks.

There has never been a failure of the Yarmouth herring fishery; although fish are less abundant some years, they have never been so scarce as to make fishing unprofitable. Some of the Yarmouth fishermen think that the herring frequenting that part of the English coast constitute a distinct body which spawn and remain off that coast, and do not come down from the North. Herring are taken much earlier in Scotland and northern England than here.

When a vessel arrives in port the fish are lifted out of the hold in baskets and spread on deck, where they are counted into baskets by hand, 100 fish to a basket. These baskets are then passed over the rail to the dock and emptied into large, peculiarly shaped baskets holding 500 fish, arranged on the dock in lines or tiers of 20 baskets each. The fish are heaped in 10 piles over the edges of adjoining baskets to facilitate counting. A line of the large baskets constitutes a last, which is the unit of measure in the herring trade. A last represents about $1\frac{1}{2}$ tons of herring, or, theoretically, 10,000 fish; but, as a matter of fact, 13,200 fish of any size, as 132 fish are called 100 in counting.

Herring are sold at public auction by lasts. The buyer puts his card or tag on the first basket of the tier, and his drayman comes shortly afterwards and takes the fish to the pickling-house or smoke-house. Sometimes, at the height of the fishery, 1,000 lasts (or 3,000,000 pounds) are landed and sold daily in Yarmouth, and the wharves present scenes of great activity and excitement.

The Scotch herring fishery is rather uncertain. In 1900 it was poor on the Scotch coasts, except about the Shetland Islands, where there was a phenomenally large run. A number of years ago, after expensive curing establishments had been built in those islands, the fish disappeared, fishing had to be abandoned, and the packers lost all they had invested.

Different races of herring are recognized as frequenting different parts of the Scotch seaboard. Thus, according to Mr. W. C. Robertson, of the fishery board, the best herring are those taken near Barra and Loch Fyne, on the west coast. These are fine, fat fish, which have brought as much as £6 per barrel.

The different kinds of cured herring to which reference may be made are ordinary pickled fish, kippered herring, bloaters, and red herring.

BLOATERS.

A favorite form of preserved herring for local consumption is the bloater. In the United States this term has come to mean a large, lightly smoked herring, but in Great Britain a herring of any size may be a bloater, which may be defined as a round herring, lightly salted and lightly smoked, and intended for immediate consumption.

The extensive trade in Yarmouth bloaters which formerly existed with London and other cities away from the coast has to a great extent died out, owing to the fact that the smoking is now done at the place of consumption. The fish bear the rail shipment better before smoking than after, so that the bloater trade now consists largely in shipping lightly salted fish to cities where there are smoke-houses. Bloaters remain in good condition for two or three days, but are regarded as being best when smoked and eaten the day after being caught.

The essential steps in the preparation of bloater herring are as follows: Immediately after being caught the fish are dry-salted from 12 to 24 hours if fat, or only 6 hours if lean. They are then smoked for 4 to 16 hours and are ready for consumption.

Yarmouth bloaters bring a good price; sometimes as much as 17s. 6d. is received for 100 fish.

RED HERRING.

A special grade of salted and smoked herring is known to the English and Scotch trade under this name. The fish are destined chiefly for the Italian, Grecian, and general Mediterranean trade, but some are sold in London and other parts of Great Britain. Some of the herring dealers handle only red herring; but, as a rule, the preparation of red herrings is incidental to the packing of other grades.

The fish which are destined to be made into red herrings are often those which have been kept at sea for several days to a fortnight, and hence have become too hard, from prolonged salting, to be made into bloaters, kippers, or regular pickled herring. If they have been salted too long on the vessels they are spitted on sticks and softened by steeping them in fresh water. The special peculiarities of red herring are that they are round, are rather heavily salted, and are smoked for a long time to give them a good rich color.

When intended for export to very warm countries red herring are salted for 30 to 48 hours in strong brine and are then smoked for a fortnight or three weeks. For temperate or cold countries the fish are kept for a shorter time in pickle and are smoked 10 or 11 days. Hard-wood sawdust and hard-wood sticks are considered necessary in producing the smudge and heat required to give to these fish their peculiar flavor.

Red herring for the Mediterranean trade are packed with their heads against the barrel and their tails at the center, in dry-ware barrels holding 500 to 600 fish, half barrels holding 300 to 350 fish, and kegs or third barrels holding 180 to 200 fish. The average gross prices for these packages in recent years have been 10s., 5s. to 6s., and 3½s. to 4s., respectively. The expenses on a barrel for freight and commissions are about 3s., the fish being sent by rail to Liverpool and thence by water to the Mediterranean. They are sometimes packed in tin cases when destined for especially warm countries, and for the London market they are packed in flat boxes holding 50 to 60 fish.

KIPPERED HERRING.

Among the various kinds of prepared herring none ranks higher than kippered herring. The essential characteristic of kippered herring (and of all kippered fish) is that, before being salted and smoked, they are split and eviscerated. Fish intended to be made into kippers should be very fresh when received from the vessels. At Yarmouth large fish are preferred for this method, while at Aberdeen small, fat fish are preferred.

As soon as received they are split down the back from tail to head, eviscerated, and then salted in strong brine of Liverpool salt for 15 to 60 minutes, according to fatness. They are then spread on square sticks by means of hooks, and smoked over a hot fire of hard-wood shavings for 6 to 8 hours (Aberdeen) or 10 to 16 hours (Yarmouth), requiring constant attention. The color imparted to the skin is either golden or light, to suit the markets. After cooling they are packed in boxes

holding 4 to 6 dozen, and are sold at good prices throughout the United Kingdom. They have longer life than bloaters, will easily keep for three to five days, and in cool weather a fortnight, but they should be eaten as soon as possible.

WHITE-CURED HERRING.

Under this name are officially recognized the herring brine-salted and packed in barrels and half barrels. Such fish are more extensively prepared than all others combined, and give to the English and Scotch herring trades the importance they have attained.

Various grades of herring are recognized by the salt-herring trade. These grades are sharply distinguished and are usually indicated on the outside of the barrel by a brand. Branding is more generally practiced in Scotland than elsewhere.

The grades of salt herring in England are "mattie," "mat full," "full," and "spent" or "shotten." "Matties" are the smallest herring, $8\frac{3}{4}$ to $9\frac{1}{4}$ inches long, with undeveloped reproductive organs; "mat fulls" are fish $9\frac{1}{4}$ to $10\frac{1}{4}$ inches long, with the ovaries and spermaries left in; "fulls" are fish $10\frac{1}{4}$ inches or more in length, with roe or milt; and "spent" fish are at least $10\frac{1}{4}$ inches long, with eggs or milt discharged.

The grades as recognized in Scotland are "mattie," "mat full," "full," "large full," and "spent," and several other minor grades. The word "mattie" originally meant a maiden herring, "mattie" being the terminology of the east coast and "matje" of the west coast. "Matje" still retains the original meaning, the herring so designated being caught in May and June; all such fish when salted are now sent to Russia. "Mattie," however, represents a small herring, full of either roe or milt, or even spent. The official requirements of the herring of the various grades are as follows: "Mattie," not less than 9 inches long; "mat full," not less than $9\frac{1}{4}$ inches long, with roe or milt well developed and clearly seen at throat; "full," not less than $10\frac{1}{4}$ inches long, with roe or milt; "large full," not less than $11\frac{1}{4}$ inches long, with roe or milt; "spent," not less than $10\frac{1}{4}$ inches long, without roe or milt.

The lengths of salted herring specified under the different grades apply to the fish after shrinking, and are measured from the end of the snout to the end of the compressed tail fin. Special measuring sticks or gages are employed by the fishery officers.

The continental markets require fish that are gilled and gutted but not split. Herring are gutted through the gill cavity, the heart, liver, and reproductive organs being left *in situ*, but the greater part of the stomach and intestines being removed.

Gutting is done as soon as the fish are landed, by a crew of three women, two of whom do the gutting while the third first "rouses" the fish (i. e., stirs them by hand in "rousing" tubs of water to remove dirt, blood, etc.) and then packs them in barrels with the proper amount of salt. In gutting, a small knife is inserted through the isthmus and, with the forefinger or thumb, draws out the viscera. The roes and spermaries are always left in, as they are considered food delicacies and, in addition, give the fish a fat or plump appearance. Sometimes the roes are so large that in packing they rupture the abdominal wall. Although excellent fish, they can not, in this condition, be sold as the best grade.

For rousing, Liverpool salt is used; but for packing, coarser Spanish salt is employed, about 100 pounds of salt being required for each barrel of fish.

In packing herring, it is customary to pack 7 barrels with a ton of fish (2,100 pounds), there being 300 pounds in a barrel. Each barrel contains from 850 to 1,100 fish, according to size. In packing, each herring is carefully arranged in a definite position, with the abdomen upward and with the head against the side of the barrel, the fish in a given layer or tier being parallel. The fish in the next layer are arranged in the same way, but their long axis is at right angles to that of the fish in the adjoining layer. The barrels are filled with alternate layers of fish and salt, and then headed. In packing, the fish are compressed vertically and their bellies are flattened, giving them the appearance of being larger and rounder. Laterally compressed fish are not in demand.

During the process of curing, the fish shrink considerably and the barrels have to be refilled. In Scotland the law requires that the barrels rest on their side and be refilled after 11 days. In England, where there is no law, about 8 days are allowed to elapse. A bunghole is bored 13 inches above the bottom, the barrel is placed on end, the head is removed, and the pickle is allowed to run off; then the hole is closed, 2 to 5 tiers of fish of the same catch are placed on top, and the barrel is closed, placed on its side, and the original pickle is returned through the bunghole. No new pickle is introduced, and under no circumstances are the fish washed in water. After branding, the barrel is ready for market. A well-cured and well-packed barrel, after the lapse of 10 full days, should contain no more undissolved salt than would fill a cylindrical tub 9 by 9 inches.

The prices of salt herring vary greatly, depending on the supply. The average price of the best grades is usually about 30s., but it may drop to 20s. or rise to 40s. In 1899 the prices in the German cities of Stettin, Konigsburg, and Danzig, and also in Russia, were the best ever known, "matties" bringing 24 to 34 marks per barrel, "mat fulls" 32 to 36 marks, and "fulls" 36 or more marks. From these gross prices, expenses amounting to about 4½ marks per barrel were deducted. In 1896-97, when there was a large catch in Scotland, the average prices of salt herring in Germany were 13 or 14 marks for "matties," 16 or 17 marks for "mat fulls," and 22 or 23 marks for "fulls."

The authorities and fishermen of Scotland fully appreciate the importance of plainly designating on the barrels the quality of salted herring, and the fishery board has formulated a very complete system of regulations governing branding. In view of the benefits which have accrued to the Scotch herring fishery from the operation of the branding regulations, and because of the importance with which the present writer regards branding as applied to the United States herring trade, the following detailed references to the subject are made.

The official branding of barrels of salted herring is not compulsory, and only about half the packers resort to branding, but it is generally regarded as facilitating the sale of fish. A good judge of herring would be able, from personal inspection, to buy just as good fish without the brand as with it; but in distant markets the brand carries a guaranty. The fee charged by the government for affixing the official brand, certifying to the quality of the fish, is 4*d.* (10 cents) per barrel. During the years 1898 and 1899 the fees from this source aggregated £11,500, or about \$57,500.

The following are the regulations now in force governing the official branding of "white-cured" herring in Scotland. They are presented *in extenso* because of their thoroughness and the model they afford:

FISHERY BOARD FOR SCOTLAND.

Regulations for examining barrels and half barrels intended to be filled, and branding and stenciling barrels and half barrels filled with cured white herrings, for the guidance of fishery officers and the fish-curing trade.

I. Capacity and mode of construction of barrels and half barrels filled or intended to be filled with cured white herrings.

1. *Capacity:* (1) Every barrel shall be capable of containing 26½ gallons imperial measure, being equal to 32 gallons English wine measure. (2) Every half barrel shall be capable of containing 13½ gallons imperial measure, being equal to 16 gallons English wine measure.

2. *Tightness:* Every barrel and half barrel shall be perfectly tight.

3. *Staves and ends:*

(a) *Thickness:* The staves and ends of every barrel and half barrel shall, when completed, be not less than one-half part of an inch, and not more than three-fourths parts of an inch, in thickness throughout.

(b) *Breadth:* (I) The staves of every barrel and half barrel shall not exceed 6 inches in breadth at the bulge. (II) The head end of every barrel and half barrel must contain not less than three pieces and the bottom end not less than two pieces.

(c) *Quality, etc., of staves:* The staves of every barrel and half barrel shall be well seasoned and well fired, so as to bring them to a proper round. The staves shall not be cracked, broken, or patched, and there shall not be a double croze. The chime shall not be less than 1 inch in length.

(d) *Fitting of ends in crozes:* The ends of every barrel and half barrel shall fit properly in the crozes, and shall not be turned inside out, nor bent outwards nor inwards so as to affect the sufficiency of the barrel or half barrel.

4. *Hooping:* (1) Every barrel or half barrel shall be hooped in one of the three following ways, viz: (a) Entirely with wooden hoops; (b) entirely with iron hoops; or (c) partly with wooden hoops and partly with iron hoops.

(a) *Entirely with wooden hoops:*

Every barrel or half barrel hooped entirely with wooden hoops shall be hooped in either of the two following ways, viz: (1) Every barrel and half barrel shall be full-bound at the bottom end and have at least three good hoops on the upper quarter, and every barrel shall have four good hoops and every half barrel three good hoops on the head end; the distance between the nearest hoops on opposite sides of the bulge of every barrel shall not exceed 11 inches after the hoops have been properly driven; the distance for half barrels shall be in like proportion. Or, (II) every barrel and half barrel shall be quarter-hooped, the barrels with four good hoops on each end and three good hoops on each quarter, and the half barrels with three good hoops on each end and three good hoops on each quarter.

(b) *Entirely with iron hoops:*

(1) Every barrel hooped entirely with iron hoops shall be hooped in either of the two following ways, viz: (I) Every barrel shall be hooped with at least four hoops, one of those to be on each end of the barrel and not to be less than 2 inches wide, of wire gage No. 16, and the other two to be on the quarters of the barrel and not less than 1½ inches wide, of wire gage No. 17, the four hoops to be placed at proper relative distances on the barrel. Or, (II) every barrel shall be hooped with six hoops, one of these to be on each end of the barrel and not to be less than 1½ inches wide, of wire gage No. 16, one to be on each of the quarters and not to be less than 1 inch wide, of wire gage No. 18, and one to be on each side of the bulge and not to be less than 1½ inches wide, of wire gage No. 17, the six hoops to be placed at proper relative distances on the barrel.

(2) Every half barrel hooped entirely with iron hoops shall be hooped with at least four hoops, one of these to be on each end of the half barrel and not to be less than 1½ inches wide, of

wire gage No. 17, and the other two to be on the quarters of the half barrel and not less than 1½ inches wide, of wire gage No. 18, the four hoops to be placed at proper relative distances on the half barrel.

(c) Partly with wooden hoops and partly with iron hoops:

(1) Every barrel hooped partly with wooden hoops and partly with iron hoops shall have either (a) the hoop of the head end alone, or (b) the hoops of both ends, made of iron at least 2 inches wide, of wire gage No. 16. (a) If the hoop of the head end alone be of iron, the remaining portion of the barrel shall be bound with wooden hoops in either of the two following ways, viz, the bottom end full bound, with at least three good hoops on the upper quarter, or quarter hooped, with three good hoops on each quarter and four good hoops on the bottom end. (b) If the hoops of both ends be of iron, each of the two quarters shall be bound with at least three good wooden hoops.

(2) Every half barrel hooped partly with wooden hoops and partly with iron hoops shall have either (a) the hoop of the head end alone, or (b) the hoops of both ends, made of iron at least 1½ inches wide, of wire gage No. 17. (a) If the hoop of the head end alone be of iron, the remaining portion of the half barrel shall be bound with wooden hoops in either of the two following ways, viz, the bottom end full bound with at least three good hoops on the upper quarter, or quarter hooped, with three good hoops on each quarter and three good hoops on the bottom end. (b) If the hoops of both ends be of iron, each of the two quarters shall be bound with at least three good wooden hoops.

II. Marks which curers are required to put, or are prohibited from putting, on barrels and half barrels filled, or meant to be filled, with cured white herrings.

(a) On the outside of the bottom of every barrel and half barrel, at the time when they are given by the curer to the packer to be packed with herrings, there shall be legibly written or marked with red keel or black lead a description of the herrings to be packed, the date of their cure, and the number of the packer; and neither chalk nor any other substance shall be allowed to pass as a substitute for red keel or black lead, and no barrel or half barrel unmarked as here prescribed shall be examined for branding.

(b) When any barrel or half barrel has been emptied of the herrings it contained, the old marks on the bottom shall be obliterated, and the barrel or half barrel, at the time it is given to a packer to be again packed with herrings, legibly marked anew, in red keel or black lead, with the description of herrings it is intended to pack therein, the date of the cure, and the number of the packer.

(c) The curer's name and the name of the port or place of cure shall be branded on the side of all barrels or half barrels presented for the crown brand, and in addition the name of the district may be added thus: to Sandhaven may be added Fraserburgh, and to Boddam Peterhead, and above these impressions there shall be legibly scribed a description of the herrings contained in the barrels or half barrels, and the date of their cure—the month of cure to be expressed by the first letter thereof, except in the cases of January, April, May, and June, which shall be designated by JA, AP, MA, and JE, respectively; the following being given as examples of scribing: 12th July 1895, La. Full, L 12 J/95; Full, F 12 J/95; Mat. Full, MF 12 J/95; Spent, S 12 J/95; Mattie, E 12 J/95. On crown-branded barrels of herrings the year need not be branded, as that is given in the scribing and also in the crown brand, which should be placed in close proximity to the curer's name and the name of the port or place of cure.

(d) No descriptive mark or marks shall be placed on the ends of barrels or half barrels of crown-branded herrings under penalty of removal of the crown brand without return of fees.

III. Heading up of barrels and half barrels after filling them up with cured white herrings.

After filling up, according as the barrel or half barrel has been opened at the head end or the bottom end, it shall be flagged round the head or bottom, made perfectly tight to contain the pickle, and pickled at the bung-hole. The bung-hole shall be bored within 1½ inches of the foremost hoop of the left end; and both chime and quarter hoops of each end of every barrel or half barrel shall be properly nailed.

IV. Quality, method of cure, packing, etc., of white herrings necessary to secure the official brand.

Quality: The herrings shall be of good quality.

Gutting, curing, and packing: They shall be gutted with a knife, and cured, and packed in barrels or half barrels within twenty-four hours after being caught.

They shall be well cured and regularly salted, and all fish broken or torn in the belly shall be excluded.

They shall be carefully laid in barrels or half barrels, each tier being completed with head herrings, and the herrings in each successive tier being arranged transversely to those in the next tier underneath, and drawn closely together, care being taken that the heads of the herrings are kept close to the sides of the barrel or half barrel until it is completely filled.

None of them shall be laid in bulk after being cured in barrels or half barrels.

They shall, if intended for the La. Full, Full, or Mat. Full brands, be pined in salt for not less than ten free days; and, if intended for the Spent or Mattie brands, they shall be similarly pined for not less than eight free days, these periods to be exclusive of the day of cure and the day of filling up for branding; and this requirement shall apply to the herrings used in filling up as well as to those in the original packing.

Filling up:

(a) The surplus pickle shall be run well off through the bung-hole, and the seastick herrings then left in the barrel or half barrel shall be pressed down by the cooper steadily and uniformly, by daunt or otherwise (use of daunt preferable), thus testing the firmness of the original packing, and whether the surplus pickle has been sufficiently poured off or not. Pickle shall alone be used for the purpose of washing herrings offered for the crown brand.

(b) The space left in the head end of the barrel or half barrel shall then be tightly packed with herrings carefully laid, regularly and lightly salted, the barrel or half barrel being firmly filled with herrings round the sides, as well as in the center. The herrings shall be pressed firmly to the sides of the barrel or half barrel with both hands, each tier being completed with head herrings, and the herrings in each successive tier being arranged transversely to those in the next tier underneath, and the weight of the hands being pressed on each tier when finished, care being taken that the heads of the herrings in every tier are kept close to the sides of the barrel or half barrel until it is completely filled.

(c) No herrings which have lost their original pickle shall be used in filling up.

V. Conditions on which cured white herrings which have lost their original pickle may secure the official brand.

No herrings which have lost the original pickle shall be accorded the crown brand unless they have been repacked, washed in pickle, and presented separately for inspection, when if found worthy in every other respect they shall, in addition to the crown brand, receive the "Repack" iron across the St. Andrew's cross on the shoulders of the crown, so that it can not be removed without effacing the crown brand. If barrels or half barrels of repacked herrings, instead of being offered separately, are found mixed up with any parcel of bung-packed herrings presented for the brand, the whole parcel shall be rejected.

VI. Reassortment of rejected herrings for the official brand.

When herrings once presented for branding have been rejected by an officer for bad quality, bad cure, bad gutting, or for being mixed with overday's fish (see penalty for presenting overday's fish, etc., on the back of request note, and at the end of these regulations), they can not be reassorted and presented again for branding.

Herrings rejected for bad selection, or for too many undersized herrings for the standard of the iron applied for, may be reselected and presented anew, but they must be pickled with original pickle, when they may be crown-branded, if found otherwise satisfactory, with the "Repack" iron added. The daunt must be used with all repacked herrings.

Early-caught herrings: Herrings caught on the north and east coast of Scotland and on the coasts of Orkney and Shetland before 12th July shall not be crown-branded with the "Mattie" iron, while those caught on the coasts mentioned from 12th to 19th July, both days inclusive, shall have the long gut taken out before being eligible for the "Mattie" brand.

Winter-caught herrings: Winter herrings may, from the 1st November of the one year to 1st April of the succeeding year, be crown-branded, with the word "Winter" branded right across the St. Andrew's cross on the shoulders of the crown, so that it can not be removed without effacing the crown brand.

VII. Examination of barrels and half barrels in respect of their capacity and mode of construction.

(a) Barrels and half barrels intended to be filled with cured-white herrings: Officers shall examine at least four in every hundred barrels or half barrels intended to be filled with herrings, the capacity of one being tested (if necessary) by liquid measure, and the capacity of the remaining three by diagonal rod 23 inches long for barrels and 18½ inches long for half barrels, measured from the croze of the bottom end to the croze of the head end; the examination to be made at a time or times suitable for the officers themselves.

(b) Barrels and half barrels filled with cured white herrings: Officers shall examine all barrels and half barrels filled with herrings, and (if necessary) shall empty the herrings out of at least one barrel or half barrel in every hundred and test its capacity by liquid measure and test the capacity of at least three others by callipers.

VIII. Examination for branding and stenciling barrels and half barrels in respect of the quality, method of cure, packing, etc., of the white herrings they contain.

(a) The barrels or half barrels presented for branding shall be laid out so that the bottom ends come at once under the eye of the branding officers.

(b) The curer, or his authorized manager at the place of cure, having delivered to the officer the proper account of cure of the herrings presented for branding, and a request note containing the number of barrels and half barrels to be presented, the officer shall see, first, that the number of barrels and half barrels is correctly stated in the request note; second, that the request note is signed by the curer or his authorized manager (as the case may be); and third, that the branding conditions attached thereto are likewise signed by the curer or his authorized manager.

N. B. It shall be understood that no manager can be recognized as an authorized manager except under authority obtained from the board upon application previously made by the curer.

(c) Brand fees (at the rate of 4d. per barrel and 2d. per half barrel) corresponding to the correct number of barrels and half barrels in the request note shall be deposited with the officer before branding, subject to the condition that if the parcel be not branded the amount of brand fees so deposited shall be returned to the curer; or, if only a portion of the parcel be rejected, the brand fees corresponding thereto shall be returned.

(d) The curer's declaration shall then be taken and signed by him.

(e) The minimum number of barrels to be examined per hundred shall be seven. Two barrels per hundred or smaller parcel shall be examined down through the original, the remaining five down to the lower quarter hoop of either end.

Officers are not restricted to this scale, but if need be shall open as many more barrels or half barrels as they may deem requisite to satisfy them that the herrings are fit for branding, for which they will be held responsible to the board; but they shall understand that in no case whatever shall fewer barrels or half barrels than what is prescribed in the above scale be opened for examination previous to branding.

(f) The barrels or half barrels selected for examination shall, as a general rule, be opened at the bottom and head end alternately—that is to say, No. 1 shall be opened at the head end, No. 2 shall be opened at the bottom end, and so on until the whole examination is concluded. The herrings in all barrels or half barrels opened shall be searched down to the lower quarter hoop of either end, two barrels per hundred or under as in note (e), and as much farther as may be deemed necessary.

But where an officer, from any cause, sees reason to examine a larger proportion of barrels or half barrels at the one end than at the other, he shall be at liberty to substitute the examination of such larger proportion for the above alternate examination, only observing that not less than the full proportions per hundred or smaller parcel which are laid down for the minimum scale of examination shall be examined in all, and that as many more shall be examined as he may see fit.

(g) In examining a parcel the work of different packers shall be selected, as well as herrings of different dates of cure.

(h) All objectionable herrings shall be removed from the barrels examined before affixing the crown brand.

(i) When, on the first examination of herrings for branding, they are found of bad quality, badly cured, or badly gutted, refusal of the brand shall be final and absolute. When, however, this refusal has been entirely owing to the barrels or half barrels being too slackly packed with herrings, or the filling up badly selected, the case shall be treated exceptionally and shall be remedied by filling up or reselection only of the filling up, and the herrings may thereafter be branded, if in accordance with the following conditions:

- (i) They shall be presented for renewed inspection only to the officer who previously rejected them, who shall satisfy himself by full examination that they are, apart from slack packing or bad selection of the filling up, worthy of the brand.
- (ii) The filling up shall have been properly completed; but, failing this, the herrings shall be finally rejected and no further examination permitted.
- (iii) The officer shall retain the fees until the herrings are branded or finally rejected; in the latter case returning the fees.
- (iv) He shall state upon the request note the particulars of the first refusal; and if the herrings be afterwards branded, the date of branding.

When, however, a parcel is small, and upon the first inspection the deficiency in filling up is seen to be so very trifling that it can be supplied at once in the presence of the officer without difficulty or detention, the above conditions shall not apply, but the filling up may be done upon the spot and the branding proceeded with immediately afterwards, the officer being careful to satisfy himself previous to the branding that the herrings are in all other respects entitled to be branded.

(k) The officers shall see that the barrels opened are filled up and headed with proper care.

(l) The officers shall put a double crown on the bilge of the barrel examined and toward the end examined.

(m) Oversalting shall be determined by the measure known as the cog; and the quantity of salt left in any barrel emptied of fish must not exceed this measure.

IX. Branding and stenciling barrels and half barrels in respect of the quality, method of cure, packing, etc., of the white herrings they contain.

Every barrel or half barrel containing white herrings presented to one of the officers for examination shall, if the capacity and mode of construction of the barrel or half barrel, and the quality, cure, selection, packing, etc., of the herrings are, in his opinion, such as to satisfy the requirements of these regulations, (1) have branded in his presence, by means of a hot iron, on the bilge, in close proximity to the curer's name and the name of the port or place of cure, a crown surrounding the word "Scotland," a description of the herrings, viz: La. Full, Full, Mat. Full, Spent, or Mattie (as the case may be), the initial letters of the examining officer's name and the year; and (2) have stenciled in his presence, on the head end, a crown surrounding the same word, description, and letters as those branded on the bilge, with the words "Fishery Board, Crown Brand," stenciled below.

X. Requirements of the different brands.

In addition to what are contained in the foregoing regulations, the requirements in respect of the different brands shall be as follows:

Crown "La. Full" Brand.

Barrels or half barrels of herrings for this brand shall contain large full herrings of not less than 11½ inches in extreme length, as measured by the fishery officer's gage, made for the purpose. Rejections under this brand shall be:

(1) On original packing for spent, torn, broken herrings, or herrings of bad or indifferent quality if more than fifteen; or, on filling up, if more than six.

(2) On original packing if the undersized amount to more than fifteen; or, on filling up, to more than six. And the parcel shall also be rejected if it should appear that the larger herrings suitable for this brand have been previously taken out.

Crown "Full" Brand.

Barrels or half barrels of herrings for this brand shall contain full herrings of not less than 10½ inches in extreme length, as measured by the fishery officer's gage, made for the purpose. Rejections under this brand shall be:

(1) On original packing for spent, torn, or broken herrings, or herrings of bad or indifferent quality, if more than eighteen; or, on filling up, if more than nine.

(2) On original packing if the undersized amount to more than eighteen; or, on filling up, to more than nine. And the parcel shall also be rejected if it should appear that the larger herrings, suitable for this brand, have been previously taken out.

Crown "Mat. Full" Brand.

Barrels or half barrels of herrings for this brand shall contain full herrings well developed—the roe or milt being clearly seen at neck or throat without pressure—of not less than 9½ inches in extreme length, as measured by the fishery officer's gage, made for the purpose. Rejections under this brand shall be:

(1) On original packing for spent, torn, or broken herrings, or herrings of bad or indifferent quality, if more than twenty-one; or, on filling up, if more than nine.

(2) On original packing if the undersized amount to more than twenty-one; or, on filling up, to more than nine. And the parcel shall also be rejected if it should appear that the larger herrings suitable for this brand have been previously taken out.

Crown "Spent" Brand.

Barrels or half barrels of herrings for this brand shall contain spent herrings of not less than 10½ inches in extreme length, as measured by the fishery officer's gage, made for the purpose. Rejections under this brand shall be:

(1) On original packing for torn or broken herrings, or herrings of bad or indifferent quality, if more than eighteen; or, on filling up, if more than nine.

(2) On original packing if undersized amount to more than eighteen; or, on filling up, to more than nine. And the parcel shall also be rejected if the larger herrings have been previously taken out.

Crown "Mattie" Brand.

Barrels or half barrels of herrings for this brand shall contain herrings not eligible for any of the foregoing brands, and of not less than 9 inches in extreme length, as measured by the fishery officer's gage, made for the purpose, but shall not contain headless herrings. Rejections under this brand shall be:

(1) On original packing for torn or broken herrings, or herrings of bad or indifferent quality, if more than thirty; or, on filling up, if more than twelve.

(2) On original packing if undersized amount to more than thirty; or, on filling up, to more than twelve.

"Repack" Brand.

For exportation out of Europe:

1. The herrings for this brand shall have been pined in salt for not less than ten days, exclusive of the day of catch and the day of beginning to repack for branding.

2. They shall be emptied out of each barrel or half barrel in which they were originally cured, and they shall be washed clean.

3. They shall have the crown gut, if adhering to them, removed.

4. They shall be repacked into the barrels or half barrels from which they were emptied and into as many additional barrels or half barrels as may be necessary.

5. They shall be salted sufficiently, and be pickled with strong pickle made of clean salt.

6. Every barrel or half-barrel shall be full bound at the head end as well as at the bottom end, and shall have at each end an iron hoop of 1 inch in breadth.

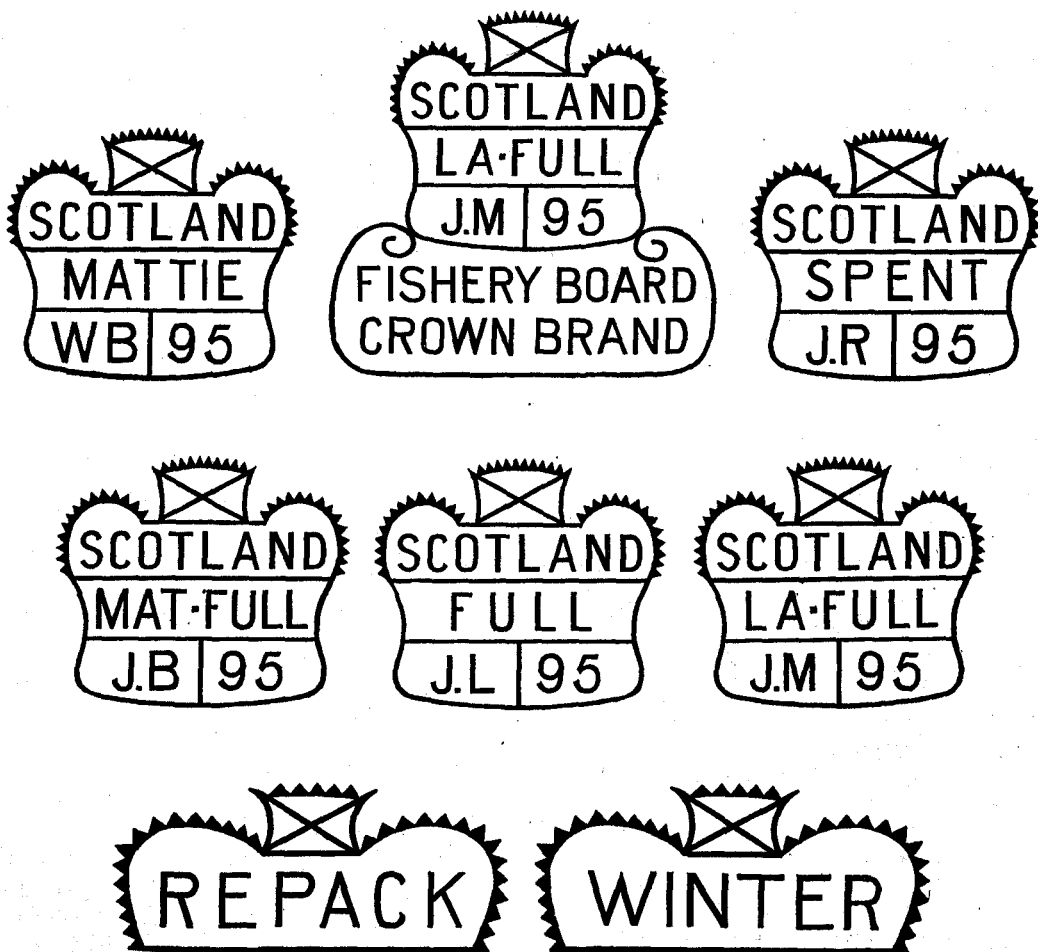
“Lozenge” Brand.

1. This brand shall be applied to herrings previously branded which have been repacked in the manner required for the “repack” brand, and the lozenge shall be stamped immediately under and close to the crown brand already upon the barrels or half barrels.

2. Upon the additional barrels or half barrels derived from the repacking the “repack” brand shall be affixed, subjoining thereto the lozenge brand as above.

Note.—By the strict letter of the act the curer or proprietor of the herrings ought to give twenty-four hours’ notice, in writing, of his intention to repack for this brand, but, of course, where the officer can accomplish his examination of the herrings sooner he should endeavor to do so and accommodate the curer as far as he can.

Under any crown brand, if the officer is satisfied with the cure, quality, etc., of the herrings, but considers them generally too flatly packed, in addition to the crown brand he shall cause the lozenge brand to be affixed to cover the St. Andrew’s cross on the top of the crown.



REPRESENTATIONS OF BRANDS USED IN SCOTLAND IN MARKING BARRELS OF CURED HERRING.

About one-half actual size.

THE DUTCH HERRING FISHERY.

Vlaardingen, situated on the Maas, a few miles below Rotterdam, is the center of the Dutch herring trade. There the herring boats fit out, there they land their catch, and there are the houses in which the fish are prepared for shipment.

The herring fishery is conducted by steam and sail vessels, which use tanned cotton gill nets 360 meshes deep and 720 meshes long, the size of mesh being 2-inch stretch. From 80 to 150 nets are carried by each vessel, this outfit usually costing from 5,000 to 7,000 guilders. The nets are set about 6 feet below the surface, being held in position by leads and by corks (5 inches long, 3 inches wide, and 2 inches thick) at intervals of a foot, the cork line being attached to the top of the net by numerous gangings 8 inches long. At times, when the herring are close inshore, some surface fishing is done.

The dressing and salting of the fish immediately after the nets are hauled on the vessels are considered of great importance by the Dutch herring fishermen, and no doubt contribute largely to the quality of the cured fish.

The Dutch method of cleaning herring is similar to the Scotch. Provided with a short knife, attached to the fourth and fifth fingers of the right hand by a string tied to the handle, the fishermen take the herring in the left hand, with the belly up and the head forward, and thrust the knife crosswise directly through the gill cavities, entering the left side and emerging from the right. The edge of the knife being turned upward or outward, the knife is pulled directly through the tissues, cutting and tearing away the gills, branchiostegals, heart, œsophagus, stomach, and often a part of the intestines; the pectoral fins, with the skin and muscle at their base, also come away with the same movement. There is apparently little effort made to remove anything except the gills and pectorals, the other organs coming away incidentally. The men become very expert in cutting, and some of them can handle 1,200 fish per hour (20 per minute).

The removal of the gills and heart results in opening the large blood vessels, and free bleeding ensues; this leaves the flesh pale or white, in contrast with the dark reddish color of the Scotch herring, in which the blood is allowed to clot. It sometimes happens in the Dutch fishery that when there is a large catch the blood has clotted in the last fish handled. The chief and only genuine benefits of cutting as now practiced are the bleeding and the opening of the abdominal cavity to the brine.

Some herring examined by me as brought in by the fishing vessels at Vlaardingen contained pyloric cæca and part of the intestines, as well as the liver and reproductive organs. The intestine, with or without the cæca, often hangs outside the wound made with the dressing knife; it is called the "zeele" (soul), and is frequently eaten by the packers of salt fish, being regarded a choice morsel.

The packing of herring is done while the vessels are still at sea. The fish are first rolled in salt and then carefully packed in straight rows, with backs down. The fish in a given layer are at right angles to those of adjoining layers. One barrel of St. Ubes salt is required to pack four barrels of herring at sea, the salt being disposed between the layers of fish. The barrels are headed up and stored in the hold until the fishing trip is ended or all the barrels filled. On reaching port the catch is unloaded and sold at auction.

The buyer almost always repacks the fish in order to sort them by size and grades of quality, no sorting being attempted on the vessels. Sometimes purchasers or agents prefer the sea-packed, unsorted fish, but as a rule the dealers or jobbers wish to know how many fish are in a barrel and what their quality is. Some shrinkage ensues; this is usually made up with fish of the same lot before the sale, the refilling being done either on shore or on the vessel.

After coming into the hands of the packer the herring are emptied into large vats or tanks, from which they are repacked according to the prevailing practice. The original brine (called "blood brine" or "blood pickle") is considered much better than any newly-made brine, and is always saved and poured back on the fish after repacking. The fish are placed in the barrels in the same manner as at sea, and fresh salt is added in the proportion of 1 barrel to 8 barrels of fish. The shrinkage in repacking is about 8 per cent—that is, 100 barrels of sea-packed herring will make about 92 barrels of fish ready for market.

The Dutch herring barrels contain about 125 kilograms of fish, and most of the catch is marketed in such barrels. Smaller receptacles— $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$, and $\frac{1}{32}$ barrels—are also used, but are not nearly so much in demand as they were a few years ago. The barrel staves are oak and are imported from New York, Baltimore, and Newport News in the form of rough pieces, which are cut into proper shape at Vlaardingen, where several thousand coopers are regularly employed. The hoops are made from willow trees grown on the dykes. White, clean barrels are required for the American trade; dark, dirty barrels are accepted by the continental countries. The Scotch herring barrel is regarded as a very good, strong barrel, and is imported by the Dutch packers. The preferred arrangement of the hoops is to have four between the bung and each end as well as four at each end, so that when the barrel is rolled its weight rests on the hoops. The bung is large and central. Some barrels have a single iron hoop at the top.

In Holland there is no official regulation of packing or branding, but the packers have a standard which is generally observed, as it is to their interest to have the fish properly packed and labeled. The different grades of herring recognized are similar to the Scotch, and are based on the spawning condition of the fish. The ripe or full fish are branded "VOL" (=full); the matties (maatjis) are branded "M"; the spent herring (ijlen) are branded "IJ" or "IJLE." Of each of these there are several qualities designated No. 1, No. 2, etc., and there are several other grades. The barrels are usually marked with a stencil.

The Dutch herring trade is not restricted to the fish caught and packed by the Dutch fishermen. Considerable quantities of salt Scotch herring are received at Vlaardingen, which, after repacking, are sold as Dutch herring. Furthermore, the Dutch sell some of their own herrings in Scotch barrels in the continental countries, where the Scotch pack is well known.

SUGGESTIONS IN REGARD TO THE AMERICAN HERRING FISHERY.

The experience of the European herring-packers has resulted in a prepared product, which meets with ready sale throughout the world at better prices than are received for other cured herring. If American herring-curers wish to supply the home markets and to establish a profitable trade with other countries, they must take cognizance of the demands of those markets and make their fish conform thereto. That there is an opportunity for a large increase in both the domestic and foreign trade in American herring there can be no doubt; and the following suggestions are made to this end:

1. While the demand for fresh herring for bait, for smoking, and for canning takes a large part of the catch on certain parts of the New England coast, there are localities where the salting of herring could be made very profitable. Even in the canning and smoking districts it may prove more remunerative to the weir fishermen to salt their large-sized herring. It seems probable that the excellent herring of the Pacific coast can be salted to great advantage and ought to find a ready market.

2. Care must be exercised in all steps of the curing and packing processes. Only plump fish in the best condition should be salted, and only sound fish should be packed. Herring of different grades should not be packed in the same barrel.

3. Different standard qualities of salt herring should be recognized and conscientiously adhered to. The organization of the United States Government would probably not warrant the Federal authorities in exercising jurisdiction in the matter of inspecting and branding fish. While this jurisdiction could doubtless be acquired (as has been done in the case of meats intended for export), it can not be regarded as essential. Each State is competent to superintend the inspection and branding of its own fish, to adopt special regulations and brand marks, and take such other measures as will tend to promote the salt-herring trade. This systematic branding under State authority is regarded as one of the most essential factors in the development of the salt-herring trade.

4. The establishment of a large trade with southern Europe, the Philippines, Australia, and elsewhere in salted river herrings or alewives is entirely feasible. These fish, which are in excellent condition when they ascend the Eastern rivers in untold millions each season, should, if properly prepared, sell almost as well as the sea herring. An especially good opportunity for promoting the alewife fishery appears to exist in the Middle and South Atlantic States, where the catch is only imperfectly utilized and where labor is abundant and cheap. The river herrings might be prepared as white-cured herring and also as red herrings.

