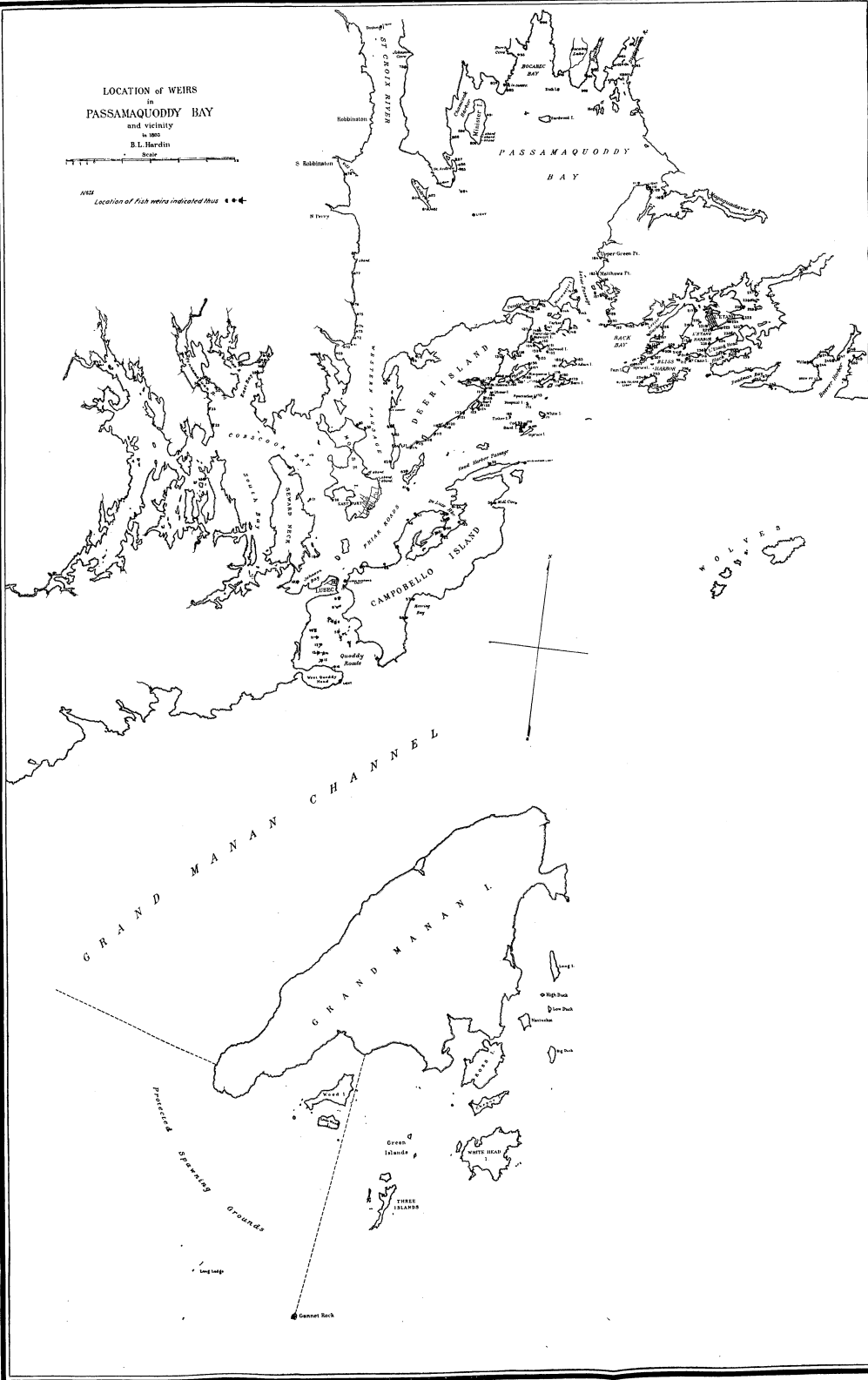


LOCATION OF WEIRS  
in  
PASSAMAQUODDY BAY  
and vicinity  
in 1903  
E. L. Hardin



NOTE  
Location of fish weirs indicated thus ■■■■



U. S. COMMISSION OF FISH AND FISHERIES,  
JOHN J. BRICE, Commissioner.

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THE  
HERRING INDUSTRY  
OF THE  
PASSAMAQUODDY REGION, MAINE.

BY

ANSLEY HALL,  
*Statistical Field Agent, U. S. Fish Commission.*

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Extracted from U. S. Fish Commission Report for 1896. Appendix 10, Pages 443 to 487

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WASHINGTON:  
GOVERNMENT PRINTING OFFICE.  
1897.

## 10.—THE HERRING INDUSTRY OF THE PASSAMAQUODDY REGION, MAINE.

BY ANSLEY HALL.

### INTRODUCTION.

The Passamaquoddy region, so far as it relates to the State of Maine, lies along the western shore of the St. Croix River and Passamaquoddy Bay in Washington County, its southern termination being at West Quoddy Head, which is the eastern extremity of the Atlantic coast of the United States. The principal localities in which the herring industry is prosecuted are Robbinston, North Perry, Pembroke, Eastport, Lubec, and North and South Lubec. The population of these places in the aggregate is about 9,000. Eastport and Lubec are the principal business centers, the former having a population of 5,000 and the latter of 1,800, or a little over 2,000 if North and South Lubec are included.

The importance of the herring industry in this region will be better appreciated when it is considered that in its various branches in 1895 it gave employment to 5,082 persons, male and female, of whom 139 were engaged in the herring fisheries, 539 in the smoked and pickled herring industry, and 4,404 in the sardine industry. A very large proportion of these is included in the resident population, and the remainder come from adjacent localities. The total amount of wages distributed was \$584,593, of which \$28,153 was paid to the employees of smoke-houses, and \$556,440 to the operatives in sardine canneries. The amount of capital invested in the herring fisheries, in weirs, boats, and appliances, was \$28,483; in the smoked and pickled herring industry, \$110,938; and in the sardine industry, \$709,037; a total of \$848,458. The cost of materials used in the smoking and pickling of herring was \$36,125, and in the preparation of sardines and other herring products, \$792,292, a total of \$828,417. The quantity of herring used for smoking and pickling was 14,647 hogsheads, or 14,647,000 pounds, costing \$45,494, and in preparing sardines or other canned herring and Russian sardines, 36,496 hogsheads, or 36,496,000 pounds, costing \$114,504; making a total of 51,143 hogsheads, or 51,143,000 pounds, costing \$159,998. The value of the products prepared at the smoke-houses was \$154,501, and at the sardine canneries, \$1,666,818, a total of \$1,821,319.

The present paper is based on an investigation made by the writer in 1896. It contains statistics of the herring industry in this region for the year 1895 and of the quantity and value of herring utilized and the products prepared in each of the years 1893 and 1894. The several branches of the industry, including the methods employed in the preparation of the products, are described, and the trade conditions prevailing during the past few years, especially in connection with the sardine industry, are briefly discussed.

## THE WEIR FISHERIES.

Passamaquoddy Bay with its tributaries, is the fishing-ground from which practically all of the herring which are used for sardines in the Passamaquoddy region, and a large quantity of those for smoking and salting, are obtained. It is located on the eastern border of the coast of Maine, between that State and the Province of New Brunswick. Its length is approximately from 10 to 12 miles, and its width, exclusive of the small bays on the west side, which are tributary to it, is about 8 miles. The inner part of the bay is landlocked by a group of islands, the largest of which (and the only ones inhabited) are Campobello Island, from 8 to 9 miles long, stretching northeasterly across the west side of the mouth of the bay, and Deer Island, about 7 miles long, situated a little to the northward and lying in the same direction. The entire group, embracing from 30 to 40 islands, some of which are very small, is included in Charlotte County, New Brunswick. In addition to this group there are a number of other islands in various localities, but none of importance, except Moose Island, on the southeast part of which Eastport is located. It is on the west side of the bay, opposite Deer Island, from which it is separated by what is known as the Western Passage, and is connected with the mainland by a bridge at Perry. It is about  $4\frac{1}{2}$  miles long, and contains an area of 1,910 acres.

The shores of the bay are irregular, and there are numerous small tributary bays and rivers. The largest river is the St. Croix, which is the outlet of the Sehoodie and Grand lakes, and forms a part of the eastern boundary of Maine, emptying into the headwaters of Passamaquoddy Bay at its northwest extremity. It is of considerable importance to navigation, and is also valuable as a fishing-ground. The international boundary line between the United States and Canada in the middle of this river has recently been extended southward along the American shore through Western Passage and Friar Roads to Lubec Narrows; but from that point to the ocean, through West Quoddy Bay, its location has not yet been definitely settled. The bay is so divided that comparatively a small part of its area is in Maine, the greater part, and, in fact, almost the entire bay proper, being in New Brunswick.

The most important tributaries in Maine which are utilized as fishing-grounds for herring weirs are the East, South, Cobscook, and Johnson bays and the Pennamaquan River. West Quoddy Bay, which is south of Lubec Narrows and between the mainland and the southwesterly end of Campobello Island, is also largely occupied by weirs owned at Lubec. On the New Brunswick shore, east of the St. Croix River, are Bocabec Bay, and Bocabec, Digdequash, and Magaguadavic rivers. At the mouth of the bay and farther east are Back Bay, Letite, L'Etang, and Beaver harbors, which are also included in this region. The most favorable locations for weirs are at the mouths of the rivers, in the small bays and coves, and about the shores of the islands.

The depth of water in many places is from 25 to 30 fathoms and in the deeper channels from 40 to upwards of 60 fathoms. The rise and fall

of the tide varies from 20 to 22 feet. The entrance for large vessels is at the east side, and the main ship-channel lies between Deer and Campobello islands. Small vessels frequently enter at West Quoddy Head, and, coming through West Quoddy Bay, pass through the Narrows at Lubec, but the water is not of sufficient depth for large vessels, except at high tide.

This bay is supplied with many varieties of fish common to the New England coast, while in the rivers tributary to it there are considerable quantities of alewives, salmon, and smelt. It seems, however, to be especially adapted for herring, which occur in its waters in greater abundance than any other species. Its location being at the mouth of the Bay of Fundy, a habitat of the herring; its natural characteristics of bottom, abounding in sea-plants and crustacea, and its strong currents running in various directions among the numerous islands and along the irregular shores, make it a favorite feeding-ground and one of the most productive fishing-grounds for this species on the Atlantic coast.

*Growth and extent of the weir fishery.*—Brush weirs for the capture of herring and other species are said to have been introduced into Passamaquoddy Bay about 1820. They gradually increased in number with the discovery of their efficiency for the purpose for which they were adopted and the growth of the demand for their product. They were first set at the west end of Campobello Island and along the shores of North Lubec, but are now distributed all around the shores of the bay, in the tributary bays and rivers, and about the islands in almost every suitable locality. At first they were not very successful, which was probably due to the lack of knowledge on the part of the fishermen as to the selection of favorable places for setting them, but in 1828 they were successfully operated and have since practically superseded the use of all other apparatus in the herring fisheries in these waters. In the upper part of the rivers they are set for smelt and salmon, but are used in other localities almost exclusively for the capture of herring. A few herring for smoking purposes are still taken with dip nets by the light of torches, which is the method known as "torching," and at times seines have been used to some extent, but the large quantities of herring utilized in the preparation of sardines are now taken in weirs.

There is no record of the number of weirs fished in the bay prior to 1849. The number estimated to have been operated in that year, exclusive of those at Grand Manan, where they were introduced in 1835, was approximately 93. Of these, 65 were on the American shore and 28 on the Canadian islands. In 1879 the number had increased to 136, of which 62 were on the American side, and 74, including 11 weirs in the Lepreau, Beaver Harbor, and Letite districts, were on the Canadian side. In 1886 in the same territory there were 330 weirs, 88 on the American and 242 on the Canadian side. This increase in number was chiefly due to the enlarged demand for herring for sardines.

The development of the sardine industry caused a marked increase in the importance of the weir fisheries. The extent of the fishing

territory on the Canadian side of the bay being much greater than on the American side, the Canadian fisheries were benefited in a corresponding degree. Their prosperity, both as to the quantity of herring marketed and the price received, has kept pace with that of the sardine industry, from the fact that the greater part of the herring used for canning purposes has been derived from the Canadian weirs.

The weirs vary in number each year, and the catch, while depending more or less upon the abundance of herring, is governed largely by the requirements of the canneries. In recent years there have not been so many weirs operated as there were in 1886. This does not necessarily imply that the fishery has decreased, but simply that the catch, which has been as large and sometimes larger than at that time, has been taken with less apparatus. In 1893 the number of weirs on the American side of the bay, including those in West Quoddy Bay, was 47, and on the Canadian side, including those as far east as Beaver Harbor, there were 193, making a total of 240, or 90 less than in 1886.

In 1895 there were 53 weirs operated by American fishermen. They were located as follows: From Robbinston to Kendall Head, 9; at Treat Island, 1; in East Bay, 8; in Pennamaquan River, 6; at Seward Neck, 2; in Johnson Bay, 2; and in West Quoddy Bay, 25. A number of those in the last-named locality were on the disputed grounds south of Lubec Narrows and along the Campobello shore, and were owned chiefly by Lubec fishermen. A more detailed statement is given in the following table, which shows the extent of the American weir fishery in Passamaquoddy Bay in 1895:

Designation.	No.	Value.
Fishermen.....	139	
Sailboats.....	78	\$5,690
Howboats.....	72	868
Pile-drivers.....	11	230
Rafts and reels.....	43	515
Weirs.....	53	18,300
Weir seines.....	52	2,224
Dip nets.....	105	500
Scoop nets.....	141	150
Total value.....		28,483
Herring taken *..... hhd.	9,684	15,134

\* A small quantity of herring taken by "torching" is included. It should also be explained that the figures relating to the catch are an estimate based on data received from the canners, smokers, and fishermen, and are intended only as an approximation.

During the same season there were, exclusive of 3 weirs on the south-east side of Campobello Island, 228 in the territory belonging to New Brunswick. Of these, 104 were located about the islands in the outer section of the bay, 35 north of the Magaguadavic River, and 89 from that river to Beaver Harbor, inclusive, making a total of 281 weirs on both sides of the bay. In previous years considerable quantities of herring were obtained from weirs in the vicinity of Point Lepreau, but the abundance of the catch in 1895 rendered it unnecessary to transport them so great a distance.

*Product of the weirs.*—The total product of the American and Canadian weirs can not be definitely stated, but some idea of the large quantity of herring taken in them during the season may be gained from the fact that there were used in the canneries, smoke-houses, salting-sheds, and for fertilizing purposes at Eastport, Lubec, and the adjacent localities 47,979 hogsheads, or 239,895 barrels, weighing about 47,979,000 pounds, the value of which to the fisherman was approximately \$99,845. Of this quantity, 36,431 hogsheads were used for sardines, 9,675 for smoking, 1,799 for pickling, and 74 for fertilizer. This comprises the entire catch, with the exception of possibly a few thousand hogsheads used in New Brunswick for similar purposes. It is probably the largest quantity that has ever been taken in these waters in one season, and considerably exceeds that of 1893 and 1894, but the price was much lower than in those years, averaging only a little over \$2 per hogshead, which made it a very unprofitable year for the fishermen. Although the fishery has been prosecuted vigorously for the last twenty years to supply the constantly increasing demand, the fish were observed to be more than ordinarily abundant. To this fact and the prevailing low prices during the year for sardines and other fish products may be attributed the low price received by weir fishermen for herring.

*Description of brush weirs.*—The brush weir is perhaps the most primitive form of apparatus in use at the present time in the fisheries of the United States, but it has proved to be especially well adapted for the capture of herring. Its origin is not definitely known, but it is supposed to have been first used either by the Indians or early white settlers about the shores of Nova Scotia. Its use in that region led to its introduction into the fisheries of Passamaquoddy Bay. Modifications of this device may be found in various sections of the country, but the typical brush weir is confined chiefly to the coast of Maine and is more numerous in Passamaquoddy Bay than elsewhere. The principle which it involves, so far as its effectiveness for fishing is concerned, is essentially the same as that of the ordinary pound net. The fish are led into a large inclosure by means of long leaders and wings, which usually terminate in a funnel-shaped entrance. Their escape is prevented by the extension of these wings into the inclosure, thereby forming a triangular hook at each end of it, so that the fish, as they circle around inside the weir, are directed past the entrance. In some instances a "drop" made of netting arranged at the mouth of the weir is used for this purpose. After the fish have entered the drop is let down and completely closes the weir.

The form of the weir varies according to the nature of the bottom or shore where it is located, and the different forms are sometimes designated by names which indicate their characteristics. A weir located beside a bar where the bar is left bare at low tide and serves as a part of the inclosure is termed a "bar weir"; one located near the shore, with perhaps one wing extending diagonally into the water while the shore answers the purpose of a wing on the other side, is called a

“shore weir.” “Channel weirs” are located in a channel between islands or ledges where the fish are known to pass through.

These forms are usually semicircular, with wings or leaders running from the inclosure to the shore to direct the fish into them. Another variety commonly used more closely resembles the ordinary pound net in its arrangement. It consists of a semicircular pound or inclosure with long wings extending out diagonally on either side and a leader or “center fence” running toward the shore. This is sometimes called a “patent weir.” It has the advantage of capturing fish on either the ebb or flood tide, while other forms often fish only when the tide is setting in one direction or the other, as the case may be.

The location of the weir is an important consideration. The herring travel along the channels or where there are strong currents, and usually against the tide; hence it is necessary that the weir be placed so as to intercept their course. Their habits are closely observed by the fishermen, and wherever they are known to frequent the weir is placed and arranged as may be best calculated to lead them into it.

*Construction of the weir.*—Brush and poles comprise nearly all the material used for building weirs. In building a weir the usual method is to first drive the mouth stakes. These are placed from 15 to 20 feet apart. The stakes to form the body of the weir are then driven about 3 feet apart. The length of the stakes is from 18 to 35 feet, according to the depth of water in which the weir is set, and they are about 6 or 7 inches or more in diameter at the butt end. They are driven into the bottom, which is usually mud, about 6 feet. Brush is then woven in and out between the stakes alternately, beginning at the bottom and filling up toward the top. The brush under water is pushed down in place by means of an implement called a spudger, which consists of an iron head a foot or more in length, with prongs projecting at each end and having a handle some 10 or 12 feet long. The brush is laid horizontally and in such a manner that the ends in one row will be overlapped by the centers in the next row. Frequently, after the stakes have been thus filled a binder, also made of brush, is placed on top. Brush is then inserted perpendicularly through the binder and shoved down securely in the brush below. The wings and center fence are built similarly.

The length of the wings is generally from 35 to 40 feet inside the weir and from 75 to 100 feet outside. The entrance to the weir at the ends of the wings or “hooks,” as the section of the wings inside the weir is called, is about 10 to 12 feet. The leader or center fence is about 125 stakes, or 375 feet in length. The leader does not always begin close to the shore, but often at a greater or less distance from it, as circumstances may require, nor does it extend all the way to the entrance of the weir, but usually terminates within about 25 or 30 feet of a line drawn from one mouth stake to the other, and a still greater distance from the “hook” stakes, or those at the ends of the wings.

In some instances the weirs are not brushed in the manner above described, but after the brush is filled in at the bottom as far up as



the surface of the water at low tide long strips or ribbands are spiked on to the outside of the stakes. These are placed some 3 feet or more apart. Brush is then interwoven perpendicularly, reaching to the top of the weir, and completes it without further binding. This method is said to take less material and make the weir lighter and less liable to be torn away by the tide.

Still another method is to drive the large stakes farther apart and construct sections on shore with smaller stakes held together by ribbands and interwoven with brush to within 3 feet of the bottom of the stakes. They are then carried out to the weir by means of boats and shoved down into the mud between the large stakes and firmly secured. In this manner all the spaces are filled till the lower section of the weir, or the part that is under water at low tide, is completed. Ribbands are then spiked horizontally on the poles above the low-tide mark and the upper part of the weir filled in with brush placed perpendicularly. But the method first described is said to be more commonly practiced in West Quoddy Bay and other sections along the American shore.

The poles used in weirs are generally of white birch. The material at the bottom below low-water mark is chiefly spruce and cedar, because of their more brushy character, the lower part of the weir requiring to be as closely woven as practicable. Birch and alder brush, the former being preferable, are used for the upper part. Boats are used both for carrying material and doing the work while the weir is in course of construction. When the weir is completed, long brush with bushy tops is placed at the ends of the wings and leader and at the bunt or extreme off-shore part of the inclosure as signals, so that the location can be seen by vessels, in order to avoid damage by collision at high water, when the weir is almost wholly submerged.

Other methods of building weirs are sometimes resorted to. In localities where the bottom is rocky and poles can not be driven a large platform is constructed of planks and timber into which the poles are set. After the framework is completed the platform is sufficiently ballasted with stone to sink it to the bottom. The weir in other respects is built in the usual manner.

*Cost of weirs.*—Weirs are built in the spring from April 1 to June 1. It is customary in the fall, after the fishing is over, to remove the brush from the upper part of the weir and save it for use the next season. It is therefore necessary to rebuild all the weirs every year. In addition to replacing the brush, which has been removed, much other work frequently has to be done to put the weir in proper condition for fishing. The storms and ice during the winter are liable to destroy some of the poles or cause other damage, which has to be repaired. The expense of these repairs each season is often considerable.

The cost of building a new weir depends largely on its size and location. Some of the weirs are small or located where a ledge or bar or the shore can be utilized to form either a part of the inclosure or serve the purpose of a wing or leader, thereby lessening the extent of hedg-

ing required. The cost of those located in sheltered positions is also reduced on account of not having to be built of so heavy material. In other instances the weirs are located in open water and exposed places where all the parts have to be constructed of brush and poles and very strongly built to resist the greater force of the sea. In localities of this kind the additional material and labor required make the weirs much more expensive. The cost of building a weir, therefore, varies from about \$40 to \$1,000, the average cost being from \$200 to \$400.

It is customary for a number of men, usually from two to five, to build, own, and operate a weir together in equal shares. In many instances the proprietors of factories and smoke-houses own a share in the weirs and furnish their share of the capital and quota of men to build and operate them. The length of time occupied in building an ordinary weir varies from about three to six weeks. The work is generally done by the fishermen.

*Names of the weirs.*—The fact may not be wholly void of interest that, notwithstanding the large number of weirs operated in this region, it is customary with the fishermen to give each weir a name. Although the names are frequently more original than elegant, they serve the useful purpose of distinguishing one from another when speaking of them, which might otherwise be difficult. They are sometimes named for one of the owners, or on account of some characteristic manner, habit, trait of character, or circumstance connected with his personal history, or perhaps owing to some incident that occurred while the weir was being built, or possibly from its location. The following are the names of some of the weirs in West Quoddy Bay: Godfrey weir, Yankee Doodle, Wild Man, Phelps weir, Haddock Point weir, Long-stakes, Hyder Ali, Raffler, Dicebox, Grasper, Greenback, Democrat, Jeff Davis, The Colonel, Jews-harp, and Uncle Sam. The owners recognize the names and use them when referring to their weirs.

*Fishing season.*—The season for fishing weirs, as prescribed by State law, is from April 15 to December 15, but it is seldom that fishing begins as early as the legal season allows. The sardine canneries do not open before May 1, and many of them not before August, consequently there is not much demand for fish until May or June. In recent years the fish have not been very abundant in the early part of the season, and this circumstance, coupled with the limited demand, has made it unprofitable to operate the weirs until later in the summer. The best fishing is said to occur from about the first of August to the end of November. There is also a better demand for the fish at that time than earlier, both for canning and smoking purposes. But the weirs are put in order by the first of June, and the fishing is prosecuted as vigorously as the abundance of fish and the demand for them may warrant until the end of the season.

*Seining the weir.*—The stationary character of all the parts of a weir make it necessary to use a seine for taking out the fish after they have been entrapped. The seines used for this purpose vary in length accord-

ing to the size of the weir, but are usually from 18 to 22 fathoms, or 108 to 132 feet. They vary in depth from 10 to 18 feet at the ends and from 15 to 30 feet in the middle or bunt. The size of the mesh is 1 inch stretched. They are made of about 9 thread No. 20 cotton twine. Linen twine is never used for weir seines. The floats, which are either of cork or cedar, are placed 6 inches apart or thereabouts and the leads about  $4\frac{1}{2}$  inches apart. A stone or iron weight of about 50 pounds is sometimes attached to the lead line at each end of the seine to keep it close to the bottom. A purse line extends around the bottom of the seine, passing through a series of 2-inch iron rings, which are attached to the lead line about 3 feet apart. The seines cost when new from \$40 to \$60 each. Very large ones sometimes cost as high as \$75 or \$100 each.

In operating the weir from two to five men are engaged, each one of whom has a boat and is either an owner or represents one of the owners in the weir. The seine, like the weir, is owned on shares. The time selected for seining the weir is at low tide, whether in the day or night, for it is customary to fish on both tides. In most instances the seine is kept on a seine-reel located on a raft, which is moored near the weir; in others it is taken ashore to dry, and is carried out to the weir each time in one of the boats. In the night torches are used if a light is required to see whether there are fish enough in the weir to warrant the labor of hauling the seine, or for any other purpose in which a light might be necessary to the men in their work. When the time arrives to haul the seine, the boat containing the seine is taken inside the weir. Attached to each end of the seine is a pole or staff. One of these poles is pushed down into the bottom beside one of the hook stakes at the mouth of the weir and made fast to it. The seine is then stretched across the entrance and the boat is gradually moved around the sides of the weir, thus drawing the seine around the weir until the two ends are finally brought together with the fish inclosed in it. The bottom of the seine is then pursed up, the top being hauled in at the same time. In this way the fish are brought together in a body sufficiently compact to enable the fishermen to dip them out of the seine into boats.

The fish are dipped out of the seine with large dip nets. The bow of the dip net is from 3 to 5 feet across; the handle is about 12 feet long, and the bag, which is made of twine, is from 6 to 8 feet deep. The nets cost from \$4 to \$6 each, and form a part of the equipment of each boat. One of these nets will hold from 3 to 4 barrels of herring. The net is dipped in among the fish and filled. It is then lifted and the bow brought over the gunwale of the boat, the mouth of the net being turned downward with the handle extending lengthwise of the boat and resting across the thwarts. With the net in this position the men pull in on the twine, which causes the fish to slide out of the net into the boat. This process is termed "rolling" them into the boat and relieves the men of the necessity of lifting so large a quantity of fish, the weight of which would be, when taken from the water, from 600 to 800 pounds. So long as the fish are in the water their weight is not

appreciated, because they support themselves. When the work of taking out the fish is completed, the seine is thrown back into the water and the fishermen begin at one end of it and haul it into one of the boats in regular order. In this way it is washed and prevented from tangling. It is then replaced on the reel or carried ashore, as the case may be, and dried ready for use at the next tide.

The method of disposing of the fish as they are taken from the weir varies according to circumstances. In most instances regular collecting boats for transporting fish visit the weirs while the seining is in progress. If one of these is present the fish are carried to it by the weir boats, and after being dipped with scoop nets into baskets and measured they are put on board the collecting boat and transported to the canneries and smoke-houses. Fish that are too large for sardines are utilized for salting and smoking purposes. The proceeds arising from the sale of the fish are divided equally among the owners. In some localities many of the weir fishermen carry on the smoked-herring business quite extensively and utilize all their own catch, except the sardine herring. Their boats are much larger than the regular weir boat, so as to be suitable for transporting the fish as well as for fishing the weir. In cases of this kind the fish are divided among the owners, each one taking his share as they are dipped from the seine.

A peculiar custom obtains with reference to dividing the fish or proceeds in case of one or more of the owners of the weir being absent and not participating in the fishing operations. If the number present is not less than two, the weir is seined and the proceeds divided equally between those who are there. The investment of the other owners in the weir is not taken into consideration. This is what is termed "shooling" the owners who are absent. If none of the owners are in attendance and other fishermen discover that there are fish in the weir, they are at liberty to seine it and appropriate the catch to their own use. The weir is then said to have been "shooled."

*Weir boats.*—Open sailboats are generally used by the American fishermen for operating the weirs, because so many of them utilize a considerable part of their catch in the preparation of smoked herring and require a boat that can be used for transporting fish as well as for seining the weir. The boats vary in length from 16 to 20 feet on the keel and from 20 to 26 feet over all. The width is from 7 to 9 feet amidships, and the depth from 3 to 3½ feet. The bow is sharp, with a moderately raking stem, rounding at the foot. The stern is also sharp in most instances, and rakes rather more than the stem. The sternpost rises flush with the gunwale, and sometimes slightly above it. The bottom is straight and the keel is about 6 inches in depth outside of the planking. The stem and stern are both high, and the gunwale has a strong sheer. The older boats are clinker-built, but most of the new ones are carvel-built. There is a washboard from 8 to 16 inches wide, with a coaming. The ceiling runs the entire length of the boat, and there is no floor. The ballast, consisting of stones, is placed on top of

the ceiling. There are five thwarts. Kidboards are used under the forward and after thwarts, and in large boats under the center one, but seldom under the other two; these provide two compartments for convenience in carrying and handling fish. There is a forward and after standing room, and a cuddy in the bow and stern. The steering gear is hung on the outside and operated with a tiller.

The boats are timbered with oak, white ash, or hackmatack. The knees are usually spruce. The planking is white pine from three-fourths to seven-eighths of an inch in thickness. The washboards are of pine, the coamings oak or ash, and the thwarts spruce. Only one mast is used, the length of which varies from 22 to 30 feet. It is stepped well forward, being from 2 to 4 feet from the stem, according to the size of the boat, and is not supported by standing rigging. A mainsail, rigged with gaff and boom, is the only sail carried. It varies in area from 40 to 60 yards. Each boat is supplied with one pair of oars and a small anchor weighing about 15 pounds and having a 2½-inch manila cable. The boats are generally very round on the bottom, so that they will roll down easily when the fish are being dipped from the seine. A square-stern boat is rarely seen. They differ from the sharp-stern boats mainly by having no keel and being fitted with a centerboard. The greater number of the boats are built at Lubec, and cost from about \$100 to \$200 each, and their carrying capacity is from about 5 to 10 hogsheads of fish.

*Rowboats.*—Small rowboats are also used to some extent as tenders to the sailboats. These are either ordinary dories, 15 feet in length, and bought mostly at second hand and costing not more than from \$7 to \$10 each, or small, round-bottom boats built new for the business. The latter kind are called "gigs" or "dingies." They are from 11 to 15 feet in length on top, and from 3 to 3½ feet in width, with two to three thwarts, and have one pair of oars. They cost from \$10 to \$18 each, according to their size. They are used for plying between the sailboats and the shore, and for various work while fishing the weirs when a larger boat could not be so conveniently managed. Large rowboats of a similar description, varying in value from \$20 to \$50 each, are also used in some localities for fishing the weirs. In some instances they are only used for operating the seine, the fish being carried in a sailboat; in others they serve both purposes.

*Collecting boats.*—Collecting boats are used for transporting herring from weirs to the canneries and smoke-houses. Each cannery employs from one to four, and sometimes a larger number, of these boats, but fish for the smoke-houses, especially those not connected with the canneries, are more often transported by the boats used in fishing the weirs. The greater number of collecting boats are large, sloop-rigged sailboats, averaging from 28 to 30 feet in length and costing when new about \$300 each. In some instances small vessels of both sloop and schooner rig are used for collecting fish. Nearly all of the vessels and boats have sharp or "pink" sterns. They vary greatly in size, and for

the whole fleet range in value from \$75 to \$1,000 each. The carrying capacity of the sailboats is from 5 to 10 hogsheads of herring, and the vessels often carry a much larger quantity. Small steamboats are also used to some extent for carrying fish and towing the sailboats when the wind is unfavorable or insufficient for the use of sails. Tarpaulin is used on open boats for covering the fish to protect them from the sun, while the hatches serve that purpose on larger craft. The boats are usually owned by the boatmen and have a crew of 1 or 2 men each.

The number of vessels and boats employed by the canneries in 1895 as collecting boats and lighters was 88, valued at \$32,437. In addition to these, there were 26 employed by the smoke-houses, having a value of \$8,756, making a total of 114, valued at \$41,193.

#### THE SMOKED AND PICKLED HERRING INDUSTRY.

*General note.*—Smoked and pickled herring are prepared more extensively at Eastport and Lubec than in any of the other localities in this region or elsewhere in the State. The smoking of herring was introduced at Eastport in about 1808, and at Lubec in 1812. The two places had a population at that time of about 1,500. It is probable that herring were pickled and packed in barrels for market by the fishermen of this section before the beginning of the present century. The smoked-herring trade, which is the more important of the two branches, increased with considerable rapidity and eventually became a large industry. It is estimated that the quantity of herring smoked each year from 1845 to 1865 was not less than 500,000 boxes. After the close of the civil war the demand fell off to some extent, and during the period of the Washington treaty, from July 1, 1873, to June 30, 1885, it was so reduced by the large importations of smoked herring from the British Provinces, which were admitted under the terms of the treaty free of duty, that in 1880 the output for the entire State was only 370,615 boxes, or 4,434,111 pounds, having a value of \$99,973. In the meantime the imports increased from 1,029,095 pounds valued at \$34,670 in 1874, to 10,441,355 pounds valued at \$129,034 in 1885. Since 1885 the industry has gradually regained its former importance, and was probably more extensive in 1894 and 1895 than ever before. In the year following the abrogation of the treaty the imports for consumption dropped more than one-half, being only 4,246,970 pounds, and have since continued to decrease, while the exports have practically doubled.

Pickled herring are usually packed in the salting sheds connected with the smoke-houses, the work being performed by the same persons who are engaged in the smoking operations. There is, therefore, seldom any extra outlay for buildings in which to carry on this branch of the industry. The season for smoking and pickling is chiefly from the 1st of August to the middle of December.

*Description of smoke-houses.*—The smoke-house is generally only one of a number of buildings used in carrying on the smoked-herring industry. In addition to it, there are sheds and shops of various kinds, in which is done a variety of work incidental to the business. There is a

shed for pickling and salting herring, a shop in which the smoked-herring boxes are made and where the herring are packed, and there is sometimes a cooper shop for use in making herring barrels. The buildings are usually located on a wharf or near the shore for convenience in landing the fish from the boats. The frame of the smoke-house is covered with boards and made sufficiently tight to prevent the smoke from escaping. There are board windows in either side and ventilators in the roof. The latter are provided by arranging the boards on either side of the ridge-pole, so that they can be raised or lowered by means of cords attached to levers. The building is entered by large doors in the end. The value of the smoke-houses, including the sheds and equipments, varies from \$60 to \$3,500 each; for an entire stand of buildings the average value is from about \$200 to \$500.

In the early days of the industry the smoke-houses were very inexpensive, being built of slabs obtained at small cost from the sawmills in the vicinity. A very few of these primitive structures, now almost a century old, are still in use, but in most instances they have been replaced by better ones. As the business increased larger smoke-houses were built in order to make it possible to meet the greater demand for the product. The largest one now in use is at Lubec. The length of the building is 231 feet, 115 feet of which is included in the smoke-house, and 116 feet in sheds of various kinds. The width is 25 feet, the length of posts 16 feet, and the height of the ridge-pole 29 feet. The smoke-house is divided into three compartments, each having 10 "bays" or spaces in which to hang herring, and its capacity is about 45,000 boxes of medium or 60,000 boxes of large herring. It is as large as three smoke-houses of the ordinary size. The smoke-houses have no floors, as the area has to be used for the fires. The interior is arranged with a series of vertical rows of 2 by 4 inch scantlings. The spaces between the rows are termed "bays," and are 38 inches in width. The scantlings in each row begin near the ridge-pole and extend horizontally crosswise of the building, each one being placed from 13 to 14 inches below the other, to within 6 or 8 feet of the ground. In smoke-houses of the average size there are usually 10 "bays," and the capacity is about 15,000 boxes of medium or 20,000 boxes of large herring.

*Equipment.*—The only equipment used exclusively in a smoke-house are the herring sticks. A large number of these are necessary in the larger houses, as it requires on an average about two sticks to each box of herring. The sticks are prepared at the sawmills in long strips. The size of the sticks as they come from the mill is one-half inch square for medium and five-eighths inch square for large herring. After being cut into lengths of 3 feet 4 inches each, the edges taken off, and one end sharpened, they are ready for use. They cost at the rate of about \$3 per 1,000 at the mill, and are estimated to be worth from \$4 to \$5 per 1,000 after being made at the smoke-house.

The pickling and salting shed is supplied with wooden tanks for use in pickling the herring. These are from 7 to 8 feet long, 5 feet wide,

and 3½ feet deep, having a capacity of about 4 hogsheads, or 20 barrels, of herring each. From 2 to 9 tanks are required in each salting shed. In many instances hogsheads are used instead of tanks. There is also a variety of other utensils, such as tubs, baskets, shovels, and "herring horses." The latter consists of an oblong wooden frame having four legs, the sides extending far enough beyond the end to serve as handles. It is used to hang the herring on to dry, after they are strung on the sticks and before putting them into the smoke-house. Its capacity is from 25 to 30 sticks of herring. The cost of the whole outfit for a smoke-house and salting shed varies from \$50 to \$500.

*Materials.*—A large quantity of material is used in preparing smoked and pickled herring. The lumber of which the herring boxes are made is usually of spruce or fir, and is manufactured at the sawmills into what are termed "shooks." A "shook" consists of the bottom, cover, sides, and ends for one box. The boxes are made, that is, nailed together, at the smoke-house. The dimensions of the shooks depend on the size of the boxes. The bloater boxes are 18½ inches long, 11½ inches wide, and 7½ inches deep in the clear. The thickness of the ends is seven-eighths inch and of the other parts three-eighths inch. The regular herring boxes are 12 inches long, 6½ inches wide, and 2¾ inches deep, the thickness of the ends being five-eighths inch and of the other parts one-fourth inch. The "bloater shooks" cost from \$60 to \$70 and the "box shooks" from \$9 to \$12.50 per 1,000, which is the material for that number of boxes. Although the shooks are one of the largest items of expense, other materials, such as nails, wood, salt, and barrels, cost considerable in the aggregate. The amount paid for shooks in 1895 was \$16,970; nails, \$1,313; wood, \$4,124; salt, \$8,461; barrels, \$5,257, making a total of \$36,125, being nearly one-third the entire cost of producing the pack of smoked and salted herring.

*Herring utilized.*—The herring utilized for smoking and salting are derived chiefly from the weirs in Passamaquoddy Bay and its tributary waters. In 1895 the quantity obtained from the American weirs in the bay for these purposes was 5,903 hogsheads, valued at \$12,121, and from the Canadian weirs 5,571 hogsheads, which cost \$20,036. The average value per hogshead of the former was \$2, and of the latter about \$3.60. This difference is explained in a measure by the fact that a large part of the American fish was smoked by the fishermen, who carried them to the smoke-houses in their own boats, while those from the Canadian weirs were collected at the rate of \$1 per hogshead. A considerable quantity of herring was also obtained from other sources. From Machias Bay there were 1,296 hogsheads, costing \$4,605; from Grand Manan, 935 hogsheads, \$2,323; from the Magdalen Islands, 768 hogsheads, \$4,669, and from Newfoundland, 174 hogsheads, \$1,740. The total quantity used was 14,647 hogsheads, or 73,235 barrels, the cost of which, landed at the smoke-houses, was \$45,494. Of these, 12,148 hogsheads, costing \$36,215, were smoked and packed in boxes, and 2,499 hogsheads, costing \$9,279, were salted in barrels. The her-



ring from Passamaquoddy Bay, Machias Bay, and Grand Manan are received in a fresh condition, while those from the Magdalen Islands and Newfoundland are cured on board the vessels and need no further salting after they arrive at the smoke-houses. The Newfoundland herring are used largely in preparing the grade of smoked herring termed "bloaters," but those from the Magdalen Islands do not serve that purpose so well and are generally either packed in barrels as round herring or smoked and packed in regular boxes lengthwise.

*Pickling.*—When the fresh herring, intended for smoking, are landed at the salting sheds, they are immediately put into the pickling tanks, which have first been partially filled with a weak pickle. The pickle is made of salt water with about  $1\frac{1}{2}$  bushels of Liverpool salt or a smaller quantity of Cadiz or other coarse salt in each tank. The salt is stirred in the water until it is wholly dissolved. If the fish are poor the water is sometimes used without the salt being added. The quantity of fish which is at first put into the tank is generally from 2 to 3 hogsheads, or enough to be of sufficient weight to rest or, as the fishermen term it, "ground" on the bottom. A light layer of salt, or about one-half bushel, is then distributed over them, after which another layer of fish of from 1 to 2 barrels is put in. This is again covered with a layer of salt rather heavier than the first, being from 1 to  $1\frac{1}{2}$  bushels. The remainder of the fish necessary to fill the tank is then put in and covered with from 3 to 5 bushels of salt. Each tank when filled contains 4 hogsheads of fish, and the quantity of salt used on them varies from 6 to 9 bushels, according to their size and fatness and the condition of the weather. It is also necessary to have the greater part of the salt at the top of the tank, so it will not work down through the fish and lodge at the bottom without being dissolved. In that case the fish at the bottom are liable to become too salt and those at the top not salt enough. For smoking purposes the fish are pickled in a round condition as they come from the water. When hogsheads are used instead of tanks the quantity of fish and salt in each layer is regulated to correspond with the capacity of the hogshhead.

The small herring are generally allowed to remain submerged in the pickle from 24 to 36 hours, and the larger ones, especially if they are very fat, about 48 hours and sometimes a longer period. If the herring are small and not fat, the length of time required for them to "strike" may not exceed from 12 to 15 hours. Fish will also absorb salt more readily in warm than in cold weather, and if they have been caught a few hours before being salted they do not require so long a time in the pickle as when immediately taken from the water.

When the fish have been properly "struck" or salted, if the weather is fine, so as to afford them an opportunity to dry before being put in the smoke-house, they are taken out of the pickle; but it sometimes happens that the weather is rainy, and they have to remain in pickle much longer than would otherwise be necessary. As a result they become more or less oversalted. In such cases, when favorable weather

returns, they are taken out and put in tubs of salt water to be freshened or "soaked out." Newfoundland and Magdalen herring, which are heavily salted on board the vessel when caught, invariably require to be treated in this manner before being smoked. Generally about four tubs of water are used, which are in succession filled with fish. As soon as the last tub is filled the fish are taken out of the first one, and then out of the others in regular order, each tub being at once refilled with other fish, and this process is continued until all the over-salted fish have passed through the water, remaining there only long enough to secure the desired result. If the quantity of fish is large the water in the tubs is changed whenever requisite. It is customary to use salt water for nearly all purposes. The fishermen and smokers claim that fresh water has a tendency to make the gills of the herring tender, and more liable to break and allow the fish to fall from the sticks after being hung in the smoke-house. They also think that the salt water makes the flesh of the fish more firm and not so apt to become soft after being smoked. The salting sheds are, therefore, sometimes furnished with steam pumps for obtaining the necessary supply of salt water.

Herring are also salted in considerable quantities, in both a round and split condition, to be packed in barrels. In the process of pickling them for this purpose more salt is used and they require to remain a longer time in the pickle. When salted round, the fish are put into the tank in thin layers, each of which is covered with a layer of coarse salt, the quantity of salt being increased toward the top of the tank until the last layer is about 2 bushels. The quantity of salt required to each tank of fish is 10 bushels or more. They are then allowed to remain in the pickle from 6 to 10 days. If the fish are to be split before being salted, they are first put into the tanks in pickle round, and are then taken out almost immediately and laid on the tables to be split or dressed. They are split down the belly, gilled, and eviscerated. The heads and tails are not removed and the roes are left in. They are then washed in salt water and returned to the tanks in strong pickle.

The first layer is about 2 hogsheads, after which about 2 barrels are put in at a time, and each layer is well covered with salt. The fish are allowed to stand two or three days and are then stirred with a spudger, an implement made of a thick piece of board a few inches wide and about 10 inches long and nailed in the center to the end of a wooden handle. After being "broken up" they are given a layer of salt and allowed to stand about five days longer. While the fish are being cured the pickle is closely watched, and whenever necessary more salt is added to keep it "sweet" or in good condition. Great care is taken to keep the fish completely submerged with pickle. Boards supporting heavy weights are frequently laid on them for that purpose. The quantity of salt required for split herring does not differ materially from that used when pickling them in a round condition. After the fish are thoroughly cured they are taken out of the tanks and packed in barrels for shipment.

*Scaling.*—It was formerly customary to remove the scales from the herring intended for smoking purposes before taking them from the boat. The fishermen, with their rubber boots, walked through the mass of fish without lifting their feet, and the contact of the fish with each other and with the legs of the men removed the greater part of the scales. This laborious process was called "treading them out." It is said to have begun in 1820 and was continued until about 1880. Another method of scaling the fish during that period was to stir them with a spudger. In recent years it has not been considered necessary to resort to these or other methods for removing the scales, since the frequent handling which the fish undergo renders them practically scaleless when they reach the smoke-house. The scales of the herring come off very easily when the fish are first taken from the water, but if allowed to dry they become set and are removed with difficulty. The methods for removing them above described insured a more thorough and uniform scaling of the fish than would otherwise be effected, but if the work was not carefully performed it was liable to result in bruising the fish and in an increased loss in "broken-bellied" herring.

*Stringing.*—When properly salted, the fish are taken out of the pickle to be strung on herring sticks, preparatory to being hung in the smoke-house. This is done with ordinary dip nets, or "wash nets," as they are called in this locality. As the fish are dipped out they are washed or rinsed in the brine with the nets, after which the pickle is allowed to run off of them and they are laid on the stringing tables. The dipping and stringing proceed simultaneously.

The "stringers," or persons who string the herring, are of both sexes, the females often predominating in number. In some instances the fishermen do the work themselves, but generally men and women and boys and girls are hired for this purpose. The number of stringers employed in each smoke-house varies from 2 to 8 and sometimes more, according to the amount of work to be done. They receive 20 cents per 100 sticks for stringing large herring and bloaters and 25 cents for small herring. The cost of stringing is estimated to average  $\frac{1}{2}$  cent per box, but is probably a little less than that. At these prices each stringer can earn from \$1 to \$2 per day. There are from 25 to 35 herring on each stick, and a person can string from 500 to 1,000 sticks in a day. The work is performed very rapidly. The herring is taken with its back in the palm of the right hand, the stick being held by the blunt end in the left hand; the left gill-cover is then raised by a movement of the right thumb and the pointed end of the stick is inserted and passed through the mouth, the fish being moved down to its proper place. The work is often done by reversing this order, the fish being taken in the left and the stick in the right hand, but in either case the herring when strung hang on the stick with their backs toward the stringer.

As a wage-producing occupation stringing is not considered important. If the stringing of the entire pack of 1895 had been paid for at the rate of one-half cent per box for regular herring and 3 cents per box for

bloaters the amount would have been \$7,592, which is considerably more than was actually paid, as part of the work was done by fishermen. The number of stringers employed being 271, the average amount of wages received by each was, therefore, less than \$28.

*Draining and drying.*—After the herring have been strung on the sticks they are washed in a trough of clean salt water and hung on the herring horses. They are then carried out into the open air, where they are allowed to remain until the water drains off of them and they have become sufficiently dry to hang in the smoke-house. The time required for drying varies according to the condition of the weather, but is usually from one to several hours. The drying not only hardens the gill-covers and prevents the fish from falling from the sticks in the smoke-house, but it also improves their quality when smoked. The work of stringing and drying the herring is generally done in the fore part of the day and in the afternoon they are hung in the smoke-house. If the weather is not fine it is sometimes necessary to dry the fish in the smoke-house, after leaving them in the open air long enough for the water to drain from them. When this method is resorted to the doors and windows are opened to give a free circulation of air and fires are kept burning until the drying is completed.

*Filling the smoke-house.*—The smoke-house is not usually filled all at one time, and it often happens that the work occupies several weeks. The herring are taken care of as fast as they are obtained from the weirs, the time required to fill the smoke-house depending somewhat on the abundance and constancy of the supply. If the supply is steady, the work progresses as rapidly as herring can be prepared; otherwise the period may be extended to three or four weeks, and perhaps longer.

When the herring have been sufficiently dried in the sun they are carried on the herring horses to the smoke-house, where the sticks are placed in the "bays," their ends resting on the scantlings or beams on either side of each "bay." The work of "hanging" the herring requires the services of at least two men, and if a larger number are engaged in it they work in pairs. One man stands in the "bay," with his feet on the beams, while the other stands on the ground or floor and hands the sticks of herring up to him, two at a time, keeping the sharp end of the stick downward so that the herring will not slip off. The sticks are made long enough to reach across the "bay" and to nearly the center of the beams which support them at either end.

The lower part of the "bays" is usually filled first. The fires are then kindled and the herring smoked until they acquire a good color. When this is effected the fires are allowed to go down, the doors and ventilators are opened to let out the smoke, and the herring are shifted to a place nearer the top of the smoke-house. The lower part is then ready to receive another lot of fish. This preliminary smoking occupies from about twelve to fifteen hours. The work is continued in this manner until the smoke-house is filled. Two smoke-houses are very often filled at the same time. In that case, after the top of the house

has been filled by shifting the herring, the lower part is completed by putting about three tiers of herring in each house on alternate days. When two houses are filled together, the work can be done in almost as short a time as would be required to fill one alone.

The object of putting the herring into the house by degrees, instead of all at one time, were that practicable, is to insure their becoming thoroughly dry before being finally subjected to the smoke, and also to smoke them more evenly and secure a greater uniformity of color. If a large body of fish were put into the smoke-house at once they would gather dampness and great difficulty would be met with in preventing them from spoiling. To fill a smoke-house holding 20,000 boxes of herring, in a proper manner, requires at least two weeks, and a somewhat longer period if two such houses are filled at the same time. The length of time also varies according to the size of the smoke-houses. Small houses may sometimes be filled in a few days.

After the smoke-houses have been filled the additional length of time required to complete smoking the herring is about three weeks. Regular herring are placed as close together on the sticks as possible without touching each other, the gill-covers generally keeping them far enough apart. The sticks, when hung, are placed about 3 inches from each other. Bloaters, owing to their larger size, need to be farther apart, both on the sticks and in the smoke-house, to allow the smoke to circulate more freely among them. They are usually hung by themselves at the bottom of the smoke-house, and while smoking are given all the heat they will bear. The "soft bloaters," which are intended for domestic use, and to be held on hand only a short time, are smoked about ten days, while the "hard bloaters" require to be smoked from three to four weeks. The smoke-house is closed while the herring are being smoked and the fires are constantly tended and kept burning in a smouldering manner, so as to produce the greatest amount of smoke.

*Fires and wood.*—The fires for smoking the herring are built on the ground at equal distances apart over the entire area of the smoke-house. The wood used is of various kinds, but white birch is generally preferred; driftwood, which has been soaked with salt water, is also used. The main consideration is to have wood that will burn slowly and produce an abundance of smoke. The fires are kept burning very slowly, the smoke-house being visited every few hours during the night as well as the day. If too much heat is generated the herring are soon damaged and may be completely spoiled.

*Packing the herring.*—The fish are not generally taken from the smoke-house until it is necessary to pack them for shipment. In the meantime, to prevent them from gathering dampness, the smoke-house is left open during the day and occasionally fires are kindled. When the time arrives for shipping them they are removed from the smoke-house to a shop or packing room, where they are assorted into grades according to their size and quality and packed in the herring boxes.

The principal grades, exclusive of "bloaters," are the "medium-scaled," "lengthwise," and "No. 1." Another grade, called "tuck-tails," are also packed to some extent. The medium-scaled herring derive their name from the now obsolete custom of removing the scales before "striking" them in pickle. They are considered to be of a more desirable size and quality and sell at a higher price than any other grade of regular herring. It is customary to divide them into two sizes, known as large and small medium herring. They are packed crosswise of the box, and each box contains from 30 to 35 of the large and from about 45 to upwards of 50 of the small size, or an average of about 45 of the two combined. The lengthwise herring are larger than the medium-scaled, and receive their name from being packed lengthwise of the box. Each box contains from 15 to 18 fish of this grade. The tuck-tails, which are also crosswise herring, are so called from the fact that, being longer than the width of the box, the tails have to be tucked or bent over when they are packed. There are usually from about 20 to 22 in each box. The grade known as "No. 1" are the smallest and least valuable quality of herring and frequently sell for not more than 5 cents per box, each box containing from 60 to 75 fish. The "bloaters" are larger than the regular herring and are packed crosswise of the box, each box containing 100 fish. The number of regular herring to the box varies considerably, according to the size of the fish, and the dealers frequently indicate the size of the grade desired by stating in their orders the number to be packed in a box.

The fish for salting, when taken from the tanks, are rinsed or "washed out" in the pickle with the "wash nets" and laid on tables, from which they are packed in the barrels. The packer first scatters about a pint of salt over the bottom of the barrel and then closely packs the fish in single layers, each of which is covered with a pint or more of salt. When the barrel is two-thirds full, the quantity of salt to each layer of fish is increased to about 2 quarts. The barrel, when filled, is left unheaded for several days or a week for the fish to settle. About a half bushel of Cadiz or other coarse salt is used in packing a barrel of round herring and a larger quantity is required for split herring. When the fish have settled, the barrels are headed, and a hole is bored in the head or bilge, as the case may be, and strong pickle is poured in through a funnel. The barrel, being full of fish, will only hold about two buckets of pickle. The rule is to make the pickle strong enough to float a salted herring. It requires about  $1\frac{1}{2}$  bushels of Cadiz or 3 bushels of Liverpool salt to a hogshead of salt water. After a time the staves of the barrel become soaked with pickle and more pickle is added, as it is necessary for the barrel to be completely filled. The holes are then plugged and the fish are ready for shipment.

*Markets and transportation.*—The principal markets for smoked herring are Boston and New York. The greater part of the pack is shipped by the regular lines of steamboats, which make from one to two trips each week during the entire year, there being no railroad communica-

tion with Eastport and Lubec. A considerable quantity is also sent to New York and some to Boston by coasting vessels. When shipped by steamboat, the boxes, except those containing bloaters, are tied together in bundles of five boxes each to render them more convenient to handle. This necessitates the use of "fish ties" (so called), which consist of strands of manila rope 14 feet in length. The rope costs from 8 to 9 cents per pound, and  $3\frac{1}{2}$  pounds, after the strands are separated, make 60 ties. Ties are not used when the herring are shipped by sail vessels. The freight rates from Eastport to Boston or New York by steamboat are  $1\frac{1}{2}$  cents per box for regular herring and 7 cents per box for bloaters. The rates on coasting vessels from Eastport to New York for carrying the regular herring are the same as those charged by the steamboats, but are reduced to 5 cents per box for bloater herring.

Herring salted in barrels are shipped chiefly to Boston and New York, and also to Norfolk and Portsmouth, Va. It is claimed that fish which are fat, however well cured and packed, will not keep well in a warm climate, and are therefore seldom shipped to southern markets. The rates of freight are 30 cents per barrel from Eastport to Boston and New York and 55 cents to Norfolk and Portsmouth. Both smoked and salted herring are shipped, to a greater or less extent, to various other points of distribution.

*Prices.*—The greater part of these products, more particularly the smoked herring, are sent to the dealers in the various trade centers to be sold on commission. The prices received have been much lower in recent years than formerly, and there has been a gradual decline in the prices of both smoked and salted herring since the beginning of 1893. In that year bloater herring averaged 77 cents per box, medium-scaled nearly 12 cents, lengthwise about 11 cents, No. 1 over  $9\frac{1}{2}$  cents; in 1894 bloaters averaged 74 cents, medium-scaled 9 cents, lengthwise 8 cents, and No. 1 about 6 cents; in 1895 the average price of bloaters had fallen to 59 cents, medium-scaled to about 8 cents, lengthwise to 7 cents, and No. 1 to about 5 cents. The value of pickled herring declined in similar proportions. In 1895 the price received for round herring was from \$2 to \$2.50 per barrel and for split herring from about \$3 to \$3.50. These prices were from 50 cents to \$1 less per barrel than in 1893.

*Extent of the smoked and pickled herring industry.*—The number of smoke-houses operated in 1895 was 89. Of these, 19 were connected with sardine canneries and 70 were conducted by the fishermen and others independent of the canneries. The value of the smoke-houses, including a small number of salting sheds where only pickled herring were prepared, was \$49,842. The amount of cash capital used in carrying on the smoked and pickled herring business was \$52,340. There were 26 collecting vessels and boats, used for carrying the fish from the weirs to the smoke-houses, valued at \$8,756, making a total investment of \$110,938. The industry gave employment to 539 persons, exclusive of fishermen, and the amount of wages paid was \$28,153. The cost of materials was \$36,125, and the quantity of herring utilized was 14,647

hogsheads, or about 14,647,000 pounds, valued at \$45,494, the total expenditure for wages, materials, and raw products being \$109,772.

The manufactured products consisted of 1,246,461 boxes of smoked herring, weighing in a smoked condition about 7,320,385 pounds, the value of which was \$124,356. There were also prepared 10,858 barrels of pickled herring, or 2,171,600 pounds, valued at \$29,326. In addition to these there was a small quantity of herring oil, pomace, and refuse fish, amounting to \$819. The total value of the output was, therefore, \$154,501. In 1893 the value of the products in the aggregate was \$145,606, and in 1894 it was \$170,198. The business was more extensive in 1894 than in either of the other years, and the prices were higher in 1893 and 1894 than in 1895.

#### THE SARDINE INDUSTRY.

*General development.*—The canning of sardines in the United States was begun at Eastport, Me., in 1875. During that year 1 cannery was operated. In each of the four succeeding years 1 new cannery was added to the number, so that in 1879 there were 5 in operation. In the spring of 1880 8 more were built at Eastport, 1 at Robbinston, 1 at Lubec, 1 at Jonesport, 1 at East Lamoine, and 1 at Camden, making a total of 18 operated in that year; 13 of these were at Eastport, which had then become and still remains the principal business center of the industry.

In 1881 3 new canneries were built at Lubec and 1 in each of the four years following, which, with the 1 built in 1880, made a total of 8 in that locality. In the meantime the canneries at Eastport and adjacent villages, Robbinston, Perry, and Pembroke, had increased to 24, so that in the year 1886 there were 32 in operation in the region bordering on Passamaquoddy Bay and its tributary waters. In addition to these there were 13 canneries located along the coast from Cutler westward, making a total of 45 operated in the State in that year. The westward movement of the industry, which began in 1880, continued with considerable energy until 1886, and threatened for a time to endanger the supremacy of Eastport and Lubec in the control of the business, but in consequence of unfavorable conditions for obtaining fish and shipping the manufactured product, and partly, perhaps, on account of the factories being scattered over so large an extent of coast, the limit then reached has not since been greatly exceeded.

At Eastport and Lubec the sardine industry, during the first ten years of its existence, increased to such proportions as to outrank all other branches of business in importance. A large amount of capital was invested and a majority of the people, the inhabitants of the Canadian islands included, in the capacity either of fishermen, boatmen, or factory employees, engaged in it. The number of canneries decreased somewhat from 1886 to 1889. In the latter year only 23 were operated in this section, and 37 in the entire State, but in 1892 the number had again increased to 32, the total number in the State in



which sardines constituted the whole or part of the pack being 46. There had, therefore, been practically no increase in the aggregate number of canneries since 1886. In 1895 there were 36 canneries in operation at Eastport, Lubec, Robbinston, Perry, and Pembroke combined. That the industry in this region has grown rapidly and attained large proportions is illustrated by the following table, showing the number of factories in operation, the quantity and value of sardines packed, and the average value per case at different periods from 1875 to 1895. For the purpose of better comparison, the products here shown have been confined to sardines proper. A variety of other products prepared at the canneries each year in considerable quantities, and which increase the value of the output to a greater or less extent, have been omitted. These consist chiefly of Russian sardines, anchovies, pickled herring, lobsters, mackerel, and herring or other species put up in round and oval cans, smoked herring and secondary products, as herring oil and pomace, and the refuse of copper, solder, and tin.

*Table showing the number of canneries operated, the number of cases and value of sardines packed, and the average value per case in various years from 1875 to 1895, in the Passamaquoddy region, Maine.*

Year.	Canneries.	Cases packed.	Value.	Average value per case.
1875.....	1	600	\$6,600	\$11.00
1880.....	15	74,255	743,618	10.14
1886.....	32	337,553	1,343,723	4.00
1889.....	23	371,195	1,417,685	3.82
1892.....	32	401,552	1,618,960	3.50
1895.....	36	680,949	1,641,303	2.41

From the above figures it will be seen that while the increase in the number of canneries was at times very rapid, notably from 1875 to 1886, there has been no period in which the annual output of sardines has not increased with still greater rapidity. This has been especially the case during the past few years. In 1875 the number of cases packed by one cannery was 600. In 1880 the average number of cases per cannery was approximately 4,950. The average in 1886 was 10,548, and in 1889 it was 16,139 cases. There was a slight falling off in 1892, the average number of cases per cannery being 14,423, but this was a large increase over that of the year 1886, when the same number of factories was in operation. In 1895 the average reached 18,915 cases per cannery. The pack aggregated 680,949 cases, the value of which was \$1,641,303, and was larger, both in quantity and value, than in any previous year. The canneries along the coast, although not engaged in the business so extensively, add materially to the quantity placed on the market each year. The figures for 1895 are not at hand, but in 1892 the pack in that section was 101,789 cases, valued at \$345,756.

*Decline in prices.*—A decline in the value of American sardines began very early in the history of the industry. The small pack prepared in 1875 sold at an average of \$11 per case. The price declined very gradually each year until 1880, when it had fallen to an average of \$10.14

per case. From 1880 to 1886 was the period of the greatest development of the industry, and also the one in which the most rapid decline in the value of the products occurred. The average value of sardines in 1886 was only \$4 per case, or less than half the price received in 1880. Even this comparatively low value was not maintained for any great length of time. Prices continued to decline steadily each year, and in 1889 the average value was \$3.82, in 1892 it was \$3.50, and in 1895 only \$2.41 per case. In the last-named year the goods were in many instances sold for much less than the actual cost of production.

It may be interesting to note the decline in the average value of the variety known as "quarter oils." This grade contains 100 cans in each case, and has always been packed more extensively than any other. In 1875 the quarter size of oil sardines was sold at an average of \$10 per case. In 1880 the average was \$9, in 1886 it was about \$4.50, in 1889 \$3.87, in 1892 \$3.65, and in 1895 only \$2.48 per case.

*Cost of production.*—The quarter size of oil sardines being the leading grade manufactured, it may properly be selected as a basis for determining the cost of production. The cost of producing this variety in 1895, including the expense of shipping and selling the goods, is estimated to have been from \$2.50 to \$2.60 per case. It must be remembered that the cost of production varies from year to year. As the price of sardines declined, the cost of material and labor required in their manufacture decreased in nearly the same proportion. This resulted both from the necessities of the industry and various other causes. The small herring—one of the most important items of material used—were never especially valuable for any other purpose. With the constantly growing demand created for them by the canneries, they continued to increase in value, even after the price of the canned products began to decline; but as the supply was generally ample, the highest limit was finally reached and the cost has since been governed almost wholly by the price of sardines. During the past few years, therefore, the price of herring has been very low, because the manufacturers could not afford to pay more, notwithstanding the fact that the quantity utilized was larger than ever before.

Tin plate is also much less expensive than formerly, and other materials have undergone more or less reduction in cost. The price paid for decorating tin plate has been greatly reduced. In the case of articles, the prices of which will not readily yield to the conditions of business, a cheaper quality has been substituted. The oil used for packing sardines is one of the important items of this kind, and there are a number of others less prominent. The cost of the product is further lessened by the introduction of more skillful and economical methods in the manufacturing processes than were formerly practiced.

Wages have been reduced to some extent, although a fairly remunerative rate has thus far been paid. Efforts to reduce them below a certain limit have usually been unsuccessful. The loss resulting from the constantly declining prices of the products has also been offset in some

measure by increasing the capacity of the canneries. In these and various other ways the cost of preparation has been kept below the receipts of sales. It is obvious, however, that the time must come, sooner or later, when it will be useless to hope for profits from the further cheapening of material and labor, and the only relief possible must be found in the improvement of the market. This point seemed to have been reached in 1895, when the value of the product was in the aggregate only a little above the cost of production, and both the cost and value were lower than ever before in the history of the industry. Some firms derived a small margin of profit on the year's business, others came out practically even, while others met with a loss.

The following statement was furnished by one of the manufacturers, and exhibits in detail the cost per case of manufacturing, shipping, and selling quarter-oil sardines in 1895. It is presented in substantially the form in which it was received, the principal change being that the cost of the fish has been placed at \$3.14 per hogshead, which was the average for that year, and the commission and discount have been computed on a value of \$2.48 per case, the average price received for this variety of sardines. No allowance has been made for taxes on property or interest on capital, but all other expenses are included. For convenience in manipulating some of the items, the statement is prepared on a basis of seven cases.

*Statement of the cost per case of quarter-oil sardines in 1895.*

<i>Material:</i>		<i>Labor—Continued.</i>	
Tin plate for 7 cases, at \$3.40 per box.....	\$3.43	General labor on 7 cases, at 18 cents per case.....	\$1.26
Decorating 35 sheets of tin plate.....	.68	Trucking 7 cases, at 1 cent per case.....	.07
Oil for 7 cases, at 30 cents per gallon.....	2.10		
Solder for 7 cases, at 25 cents per case....	1.75	Labor for 7 cases.....	6.43
Fuel for soldering, soldering coppers, and acid.....	.21	Labor for 1 case.....	.92
Shooks and nails for 7 cases.....	.53		
Fish, at \$3.14 per hogshead.....	1.10	<i>Expenses of shipping and selling:</i>	
Coal, wood, sawdust, and salt.....	.12	Freight on 7 cases, at 10 cents per case....	.70
Waste of material, 1 per cent.....	.10	Commission on 7 cases, at 5 per cent.....	.87
		Discount of 1 per cent for cash payment..	.17
Material for 7 cases.....	9.92	Fire and marine insurance.....	.06
Material for 1 case.....	1.42		
		Expenses on 7 cases.....	1.80
<i>Labor:</i>		Expenses on 1 case.....	.25
Cutting, rimming, and bending tin.....	.20	Total cost of 7 cases.....	18.15
Cutting two-thirds of 1 box of tin on dies.....	.14	Total cost of 1 case.....	2.59
Seaming cans for 7 cases, at 5 cents per case.....	.35		
Making cans for 7 cases, at 12 cents per case.....	.84	<i>Summary of the cost per case:</i>	
Sealing cans for 7 cases, at 30 cents per case.....	2.10	Material.....	1.42
Cutting and flaking fish for 7 cases, at 10 cents per case.....	.70	Labor.....	.92
Packing 7 cases, at 10 cents per case.....	.70	Cost at cannery.....	2.34
Making 7 cases, at 1 cent per case.....	.07	Expenses of shipping and selling.....	.25
		Total cost per case.....	2.59

An estimate similar to the above, made in 1886, showed the cost of quarter-oils at that time to be \$4 per case at the factory. The material then cost \$2.83 and the labor \$1.17, whereas the material now costs \$1.42 and the labor 92 cents, a total of \$2.34 per case. The cost per case was therefore \$1.66, or 41½ per cent less in 1895 than in 1886. In the estimate for 1886 the fish were reckoned at \$6 per hogshead, but the average for that year was about \$9; hence it is probable that the actual difference in the cost of production was even greater than these figures show. It will be noticed that the reduction in cost since 1886

has been more largely in material than in labor, the cost of material in 1895 being nearly 50 per cent less than in 1886, while that of labor was only 21½ per cent less. Of the total difference, 85 per cent is in material and 15 per cent in labor. Prior to 1886 the cost of manufacturing sardines was somewhat greater than it has been at any time since, but it was probably never more than about \$7 per case. The price of the products has therefore fallen much more rapidly than the cost of production, and consequently the profits have been constantly diminishing. It was not until after 1880 that the cheapening of the cost of the products became an imperative necessity.

*Overproduction.*—The enormous decline which has taken place in the price of sardines can not be wholly attributed to any one cause. On the contrary there are a number of agencies which have exercised more or less influence in producing this result. It seems not improbable, however, that the overstocking of the market was largely responsible for the decline in prices until after 1880, and has continued to be an important factor ever since that time. As early as 1881, when the capacity of the canneries at Eastport began to be greatly increased and many new establishments were being built, both in that section and along the coast westward, the danger of overproduction became plainly apparent. In fact there was then a surplus of stock on hand. The following extract,\* from the pen of Mr. Henry Sellmann, one of the pioneers in the business, illustrates the condition of the industry at that time:

There is much danger that the business may be greatly overdone. A considerable portion of the goods put up in 1880 remained unsold on January 1, 1881, and the combined capacity of the various canneries is already much greater than the present demand. Under the strong competition that must necessarily follow many of the smaller firms must go under; margins of profit will be reduced to a minimum, while the investment of capital under an accumulation of stock will involve much risk. As a result of this condition the standard of excellence will be lowered, and many worthless goods will be placed on the market at a low figure, and it will become simply a question of the brands of one cannery over another.

This prediction has been fulfilled in nearly every particular, though competition between different brands has not developed to any appreciable extent. Had this ensued the result would have been less disastrous than it has been. Unfortunately all brands have been reduced to practically the same standard on the market, and the cheaper grades have, with occasional exceptions, set the price for those of better quality.

Since 1880 there has scarcely been a season in which a considerable surplus of stock has not been carried over to the next year. In 1885 there were about 140,000 cases on hand, worth upwards of \$640,000, and in 1886 there were about 40,000 cases or more unsold on January 1, worth not less than \$160,000. Since that time the market has been overstocked almost constantly. In 1895 a large part of the pack was carried over, and the highest prices quoted for domestic quarter-oils, in the best condition, through January, February, and March of 1896,

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\* The Fisheries and Fishery Industries of the United States, sec. v, vol. 1, p. 521.

were from \$2.40 to \$2.50 per case, and in April from \$2 to \$2.30 per case. These low prices prevailed during the entire year, though certain choice brands put up in small quantities brought better prices. On account of these conditions the pack for 1896 was greatly curtailed.

*Quality of sardines.*—In the strong competition between the various manufacturers the quality of the goods has in a measure been sacrificed to the interest of producing large quantities. When the industry was first established, it was the ambition of the packers to make the quality of the domestic product equal, if possible, to that of the sardines imported from France and other countries, and thus secure at least a part of the trade which was then wholly supplied by the foreign manufacturers. It was also hoped that when the supply should exceed the demand of the home market the surplus stock might be exported. To this end, therefore, the best quality of material was used, and the greatest care was exercised in the methods of preparation, and for a few years the quality of the sardines put up at Eastport, while somewhat inferior to the best, was equal to that of the average brands imported. Had these efforts been continued until the present time, it seems not improbable that a still higher standard of excellence would have been attained. Attention was, however, soon directed toward reducing the cost of the products. One of the most important changes made was that of substituting cotton-seed and nut oils of various kinds for olive oil. This practice began to some extent before 1880, but did not become general until after that date. The cheaper oils were first introduced for frying the fish, but in a short time they were also used for packing them in the cans. Changes have also been made in the methods of preparing sardines, in order to render the performance of the work more rapid and thus increase the capacity of the canneries at a reduced ratio of cost.

There appears to be some doubt in the minds of the packers whether or not the herring (*Clupea harengus*), which is used for sardines on the coast of Maine, is susceptible of being so prepared that it will be equal in quality to the best imported sardines. It may be quite safely asserted that the character of this species does not offer any insurmountable barrier. The sardine (*Clupanodon pilchardus*) used in France, which is the young of the pilchard, the English sprat (*Clupea sprattus*), and the California sardine (*Clupanodon caeruleus*) all belong to the same family of fishes as the herring, and it is probable that any superiority which one may have over another, when packed in oil, depends more on the quality of the oil and the method of treatment than on the natural characteristics of the species. That the experiment is a hopeful one, as to its effect on prices, is indicated by the fact that in 1895 a considerable quantity of goods were so improved in quality that they were sold for at least 50 cents more per case than the best average brands. The improvement consisted mainly in frying the fish and in the exercise of greater care in their preparation. There is no doubt that their value

might have been still further enhanced by the use of either olive oil or olive oil blended with other oils of a delicate flavor.

*Selling on commission.*—The products of the sardine canneries have always been sold chiefly on commission. When the business was begun, and for a number of years thereafter, it was wholly under the control of certain large firms of importers in New York, who had been for a long time extensively engaged in the import sardine trade. At first much of the capital necessary in establishing and carrying on the business at Eastport and elsewhere on the coast of Maine was furnished by them. In fact they owned some of the factories and held an interest in many others. It was only a natural consequence, therefore, that they should control the disposition of the products. About 1880, after the industry had become established, many of the merchants and others of Eastport invested in it, and gradually the ownership was transferred to the local capitalists and manufacturers; but the dealers and brokers in New York still remained closely connected with the business in the capacity of agents for the canneries.

*Description of canneries.*—The sardine canneries are located on wharves, in order that they may be easily reached by the collecting boats. They are usually two-story frame buildings. In some instances the frames are covered with corrugated iron, to render the building less liable to be destroyed by fire. The interior is partitioned into separate rooms, for convenience in performing the various kinds of work. The value of the canneries depends upon their size and location, and the completeness of the wharves, buildings, and fixtures, and varies from about \$1,500 to \$15,000 each. One of the best establishments in the business is that of the Lawrence Packing Company, at North Lubec. It has a very spacious wharf area, and the building is large and well constructed. The main building is 150 feet in length and 32 feet in width. An ell is attached, which is 98 feet long and 30 feet wide. The building is divided into 9 rooms. On the first or lower floor is the cutting, salting, testing, die and shear, and storerooms. The second floor has the sealing, packing, and can-making rooms and a storeroom for cans. The attic is used for sawdust and as a general storeroom. The oil and mustard tanks are also located there, and their contents conveyed to the packing rooms by means of pipes. In addition, there are 3 other buildings, each being suitably arranged for its purpose. These are the office, 15 feet long and 12 feet wide; the engine room, 40 feet long and 20 feet wide, and the box building, 50 feet long and 25 feet wide. All the rooms in this factory are lighted with electricity.

The canneries are not all so well arranged as the one above described, but there seems to be a tendency toward improvement, especially when new ones are being erected. The use of electricity for illuminating purposes was introduced in 1893, and has since become quite general. A number of the canneries at Eastport are now supplied with electric dynamos, which are said to cost from \$300 to \$500 each, while others obtain their lighting power from the city.

THE HERRING INDUSTRY OF THE PASSAMAQUODDY REGION. 471

The names and location of the firms engaged in the canning industry in this region in 1895 are as follows:

Name of firm.	Location.	Name of firm.	Location.
S. B. Hunt .....	Robbinston.	Dennis Collins.....	Eastport.
Gleason Cove Packing Co.....	Perry.	William H. Holmes & Co.....	Do.
St. Croix Packing Co.....	Do.	James A. McLain.....	Do.
Pembroke Packing Co.....	Pembroke.	N. H. Kemp.....	Do.
West Branch Sardine Co.....	West Pembroke.	New England Sardine Co.....	Lubec.
E. A. Holmes .....	Eastport.	Gun Rock Packing Co.....	Do.
Charles E. Capen .....	Do.	Eureka Packing Co.....	Do.
George O. Grady & Co.....	Do.	Parker & Pike.....	Do.
H. Blanchard & Sons.....	Do.	Columbian Packing Co.....	Do.
T. L. Holmes.....	Do.	E. W. Brown & Co.....	Do.
M. C. Holmes & Co.....	Do.	Lubec Packing Co.....	Do.
Daniel McCullough.....	Do.	Lawrence Packing Co.....	North Lubec.
North End Packing Co.....	Do.	E. & W. Avery.....	Do.
Hallett Brothers.....	Do.	Royal Packing Co.....	Do.
Broad Cove Packing Co.....	Do.	North Lubec Packing Co.....	Do.
Martin & Caraher.....	Do.	Saunders & Avery.....	Do.
Faine & Kemp.....	Do.	Small Brothers.....	Do.
J. D. Young.....	Do.	Johnson Bay Packing Co....	Do.

*Persons and wages.*—A majority of the employees are residents of the towns and villages in which the canneries are located. There is also a considerable number who come in from the country and the Canadian islands in the vicinity of Eastport and Lubec to work in the canneries during the summer and return home again at the close of the season. Each cannery employs from 50 to upwards of 250 persons, or an average of about 123. Those at Eastport are generally larger than at the other localities, and employ more help. The greater number of them have from 140 to 180 operatives. The employees in all instances comprise both men and women, and a large percentage of boys and girls. The work is usually done by the piece, but clerks, foremen, and general laborers are paid by the day or week.

The boatmen who collect the herring at the weirs and transport them to the canneries are generally paid at the rate of \$1 per hogshead. Some of them receive a salary of \$30 to \$45 per month, and an additional 50 cents per hogshead.

The rates paid for piecework to other classes of help in 1895 were approximately as follows: Tin cutters, 25 cents per each box of tin of 112 sheets, whether of the large or small size; rimmers and benders, 1½ cents per 10 cases, or if, as in some instances, two boys are employed, \$1 per day each; seamers, 6 cents per 100 quarter and 8 cents per 100 three-quarter cans; can-makers, 12 cents per 100 quarter and 15 cents per 100 three-quarter cans; sealers, 30 cents per 100 quarter and 35 cents per 100 three-quarter cans; fish-cutters, 5 cents per box, equal to about \$1 for each hogshead of fish; flakers, one-half cent per flake; packers, 10 to 12 cents per case of 100 quarter and 10 cents per case of 50 three-quarter cans; leak-menders, 50 cents per 100 quarter and 65 cents per 100 three-quarter cans; and case-makers, 1 cent per case. Foremen receive from \$2 to \$3 and engineers \$2 per day; general laborers from \$1.25 to \$1.50 and \$2 per day. In most instances the rates paid for piecework are sufficiently high to enable the operatives

to earn large wages if they were steadily employed, but the canneries have to stop at frequent intervals on account of not having fish, especially in the early part of the season. As the work runs, the best-paid pieceworkers do not generally average more than \$2 per day, or from \$10 to \$12 per week, while others average only about \$8 per week. The packers are all women and girls and are said to average \$10, and sometimes earn \$20 per week. Sealers are one of the best-paid classes, and make from \$15 to \$20 per week. The fish-cutters, who are mostly women and boys and girls, often go from one factory to another, and when steadily employed can earn from \$2 to \$2.50 per day. The flakers are also women and girls. The rates of wages paid by the canneries, though only moderate, are higher than are to be obtained in almost any other occupation in these localities.

*Decorated tin.*—Before the sardine cans are made in the cannery it is necessary that the tin for the sides and around the ends of the can shall be decorated or printed with a label. This work was formerly done in New York, but is now nearly all done at Eastport, where a decorating factory was established by Mr. G. W. Capen in the spring of 1889. The building is 90 feet long, 30 feet wide, and 3 stories high, and the value of the entire plant is equal to that of some of the best sardine canneries. The business now gives employment to about 25 persons. The factory opens and closes with the canning season, which is from April 15 to December 15. Another plant was operated during a part of the season of 1895, so that hereafter there will probably be two factories of this kind at Eastport. The decorating is done by a lithographing process similar to that for lithographing on paper, except that the colors are confined to red and black, with a yellowish tint imparted by the use of shellac.

The tin plate for decorating is of two sizes, and comes in boxes of 112 and 224 sheets, respectively. The dimensions of the tin in the smaller boxes are 14 by 20 inches, or 280 square inches to each sheet; and in the larger, are 15½ by 16 inches, or 248 square inches to each sheet. The former size is commonly termed "oil tin," and the latter "mustard tin." The quality is indicated by the weight of the tin in a box. Until recently only one kind was used. This contained 85 pounds in each box of 112 sheets, and 156 pounds in each box of 224 sheets. It was found that a lighter and somewhat less expensive grade would serve the purpose equally well, and consequently many of the packers adopted what is termed an 80-pound tin, which means that 112 sheets of 14 by 20 inch tin weighs 80 pounds, and 224 sheets of 15½ by 16 inch tin, on the same basis, weighs 150 pounds. Both kinds are now used to a greater or less extent in most of the canneries.

The decoration is printed in strips crosswise of the sheets. For quarter-oil cans the 14 by 20 inch sheets are used and there are 20 strips printed on each sheet. The same size of tin is also used for quarter mustard cans, but, owing to their greater depth, admits of only 16 strips being printed on each sheet. The larger sheets, 15½ by 16



inches, are used for the half-oil and three-quarter mustard cans, each sheet having 12 strips of the former and 8 strips of the latter size. It will be understood that in each instance one strip is the requisite quantity for a sardine can, except for the cover and bottom. The prices charged for decorating in 1895 were \$1.85 per box of 112 sheets, and \$3.70 per box of 224 sheets. The rates have been considerably reduced since 1889 and 1890, when the price per box was \$2.50 for the small and \$5 for the large boxes, and still further reductions are being made.

*Plain tin.*—The covers and bottoms for the cans are cut from the plain or undecorated tin. The 14 by 20 inch size, with 112 sheets to the box, is more generally used for this purpose. For quarter oil cans one sheet of tin will make 18 covers, or the same number of bottoms, or the covers and bottoms for 9 cans. One box of tin will, therefore, make the covers and bottoms for 1,008 cans, which is 10 cases and 8 cans of this variety. The three-quarter mustard size being larger, there are only 14 covers or bottoms, or covers and bottoms for 7 cans in each sheet of tin, being 784 cans or 15 cases and 34 cans in each box of tin. The cost of the tin per box, when landed at the factory, is from about \$3.32 to \$3.40 for the small boxes, and from \$6.30 to \$6.40 for the large ones. The difference in the cost of the 80 and 85 pound tin is, approximately, 5 cents per box. On orders of 10,000 boxes or more this, it will be seen, is an item worthy of consideration. The quantity of plain and decorated tin used in the canneries in 1895 was 87,891 boxes, or about 4,000 tons, which cost, including the expense of decorating, \$378,907.

*Solder.*—The solder used in making the cans is an item of considerable importance. In most of the canneries the engineer occupies his spare time in making it. Sometimes a number of canneries have their solder made together and hire a man for that purpose. Nearly all now make their own solder, and a few sell solder to those who desire to buy a part of the quantity used. The appliance, or solder machine, consists of a brick furnace of medium size over which is arranged a large iron kettle. At the top of the kettle is a funnel fixed in such a position as to be directly over a wheel in the rim of which is a groove. These machines, including the furnace, cost from \$150 to \$500 each, according to their size. The furnace is heated with a wood fire.

The solder is made of pig tin and lead in proportions of about 70 pounds of the former to 100 pounds of the latter. After the pigs of lead have been melted in the kettle the tin is put in. When the mass has become sufficiently soft it is stirred until the two ingredients are thoroughly mixed. It is then dipped with a ladle into the funnel and allowed to run down over the wheel, which forms it into wire, and drops in coils into a pan below. The coils at first contain about 20 pounds of solder, but are afterwards separated into sections weighing from 3 to 6 pounds each for greater convenience in using. The solder kettle is usually large enough to hold from 400 to 500 pounds of solder at one time, and one man can perform the work. In addition to the

wire solder there is also a small quantity of stick solder made. The cost of solder, including material and labor, is generally considered to be from 8½ to 9 cents per pound. Great economy is exercised in the use of this as of all other materials, and the quantity now used is comparatively much less than formerly. It requires about 3 pounds for each case of quarter-oil and other varieties of sardines having 100 cans to the case and about 2½ pounds per case of three-quarter mustard and spiced sardines having 50 cans to the case. Some of the larger canneries now use about 60 tons of solder during the season, whereas it used to take from 90 to 100 tons to do the same amount of work. The quantity of solder used in 1895 was as follows:

Localities.	Pounds.	Value.
Eastport.....	1,010,962	\$88,329
Lubec.....	369,464	32,628
North Lubec.....	502,469	27,292
North Perry, Robbinston, and Pembroke.....	170,220	16,232
<b>Total.....</b>	<b>1,859,115</b>	<b>164,481</b>

The above figures show a total of 1,859,115 pounds, or about 929½ tons of solder used in the 36 canneries operated in the localities named, having a value of \$164,481, which is \$49,977 in excess of the value of the fish used for sardines. The average per cannery was a little over 25 tons. In the manufacture of the solder there were used 776,147 pounds of pig tin, costing \$115,767, and 1,125,907 pounds of pig lead, costing \$41,668. The difference between the weight of the material and that of the solder prepared from it represents the waste or dross, some of which is sold as refuse product.

*Soldering fluid.*—This is a preparation of muriatic acid and zinc, which is used as a flux in soldering the cans. It comes in barrels containing 50 gallons or 500 pounds, more or less, to the barrel. Its cost averages a little more than 1½ cents per pound for the fluid and \$1 additional for the barrel. It is applied to the tin with a brush. The total quantity used is about 500 barrels, or 249,635 pounds, costing \$4,189. The fact that the soldering is done on the outside of the cans prevents the acid from being injurious to the sardines. The possibilities of danger in this respect will be still further removed by the new method of testing the cans, elsewhere described, should it become general, as they are thoroughly washed before being filled.

*Can-making.*—The sardine cans are made in one of the departments of the cannery. The work is classified as decorated and plain tin cutting, rimming and bending, seaming, can-making, and sealing. The cutting of decorated tin consists in separating the printed strips from each other with a machine, which is termed the “shears.” As the strips have no space between them, great accuracy is required on the part of the cutter in order to avoid spoiling them, but the work can at the same time be done so rapidly that one man can cut about 12 boxes of tin per day. The plain tin is cut on a machine, the “dies,” which

not only cuts but also shapes the covers and bottoms for the cans. After the tin is cut, the decorated strips go to the rimmer and bender, who bends them into the proper shape and otherwise completes them. The seamers solder the ends of the strips together and insert the bottoms. The can is then taken to the can-makers, so called, who solder in the bottoms. The sealing, which may not, perhaps, be regarded as strictly related to the can-making, is done after the fish have been put in the cans, the work being simply to solder on the covers.

The implement with which the solder is applied to the cans is termed a "copper," from the fact that it is made principally of that metal. The soldering coppers are bought by the case or box, each box containing 25 pairs, sometimes weighing 4, but generally 5, pounds per pair, and costing from \$17.50 to \$22 per box. To fit them for use it is only necessary to adjust the iron shank of the copper to a wooden handle and forge the point on an anvil to any shape that may be desired by the operative, after which they are kept sharp by filing them. The heat for soldering is furnished by a small blast stove in which kerosene oil is used for fuel. Coke is also used to a limited extent for fuel, in this branch of the work, in some of the canneries.

*Case-making.*—The cases or boxes in which the sardines are packed for shipment are, like the smoked-herring boxes, made from what are termed "shooks." These are prepared at the sawmills and are ready for use when they arrive at the cannery. A "shook" contains the material for the sides, ends, bottom, and cover of the case, and the work of making the case consists simply in nailing the parts together, except nailing on the covers, which is done in the shipping or testing room after the goods are packed. The "shooks," which are usually of spruce, cost from \$65 to \$70 per thousand. The nails are 5-penny box nails, and cost from \$2.50 to \$3 per keg, about 50 kegs being required for 22,000 cases. The cost of one case is from 8 to 8½ cents—the shook costs from 6½ to 7 cents, nails about one-half cent, and making 1 cent.

*Treatment of the fish.*—When the fish arrive at the cannery they are hoisted from the collecting boat to the wharf in baskets. This is done by hand or steam power, but usually the latter, as nearly all the canneries are supplied with engines. The baskets are carried into the cutting room, either on wheelbarrows or by being attached to hooks suspended from an overhead track which passes close to the ends of the cutting tables. They are sometimes carried on cars which run on tracks on the floor. As the fish are brought in they are turned out and distributed along the middle of the tables, so as to be within easy reach of the cutters, who stand on either side at convenient distances apart. In the larger canneries there are sometimes from 50 to 100 persons around the cutting tables at one time. The fish-cutting consists in removing the heads and viscera, the work being done with great rapidity. The cutter takes several fish in the left hand at once and, with a large knife in the right, cuts off the heads one at a time. A sweep of the knife removes the viscera and throws the "cuttings" into a barrel

at his side. The fish are thrown by a movement of the left hand into the cutting-box which is located under the edge of the table. The cutting-boxes are each considered to hold fish enough to pack one case of sardines, and it is generally estimated that if the herring are of suitable size and in good condition, so there will be no waste except "cuttings," one hoghead will pack from 20 to 22 cases, and possibly a larger number. The cutters are attended by a man who removes the boxes and rolls aside the barrels when filled, putting empty ones in their places, so that the work may continue without interruption.

As soon as the fish have been cut they are taken to the salting-room and put into a washing-tank, where a man stands with a wash net or ordinary scoop net and washes them. The water in the washing-tank is being constantly changed, coming in by a hose and running out of a vent near the top of the tank. The fish are then dipped out into the pickling-tanks. The tanks are sometimes hogheads cut off just above the bilge, but usually they are built of planks and are about 3 feet wide and  $2\frac{1}{2}$  feet deep, being generally about 15 feet long and divided into two or three sections. They are filled with strong pickle, in which the fish are allowed to remain from twenty minutes to an hour. The length of time depends somewhat on the fatness of the fish and the condition of the weather. If they are very fat or the weather is cold it requires a longer time, but ordinarily not more than from 30 to 40 minutes. After being sufficiently "struck" in the pickle they are dipped out into baskets and allowed to drain, after which they are put on the elevator and sent up to the flaking-room. The flakers, who number from 2 to upward of 12, take the fish from the baskets and lay them on the flakes in rows. The "flakes" or frames are about 3 feet long and 22 inches wide, and are filled in with galvanized wire an inch or more apart. Each flake contains 5 rows of from 18 to 25 fish each, or from 90 to 125 to the flake, according to the size of the fish, and about 10 flakes are required to pack a case of sardines.

As soon as the fish are flaked they are ready for the oven. In the progress of the work the flaking is done faster than the baking, and the flakes when filled are placed in racks, where they remain until needed. The oven is of the rotary kind, such as is used by bakers. There are a number of iron frames suspended from arms extending from a cylinder in the center, which is revolved by steam power. During the revolutions, which are made slowly, the frames remain in a horizontal position, like the cars of a Ferris wheel, the heat being supplied by a furnace underneath. The ovens were introduced in 1879, and are now used in nearly all the canneries. They serve the twofold purpose of drying and cooking the fish. The flakes are placed on the frames in the oven and the fish subjected to the heat for a length of time varying from 15 to 30 minutes, or until they are cooked as much as possible without being discolored. They are then taken out and replaced in the racks to cool. The work is conducted by an experienced baker, who generally has an assistant or "helper." When the fish are

sufficiently cooled the flakes are taken from the racks and carried to the packing-room. In the large canneries there are from 30 to 50 persons employed as packers, who are assisted by men or boys to bring the fish and place them on the packing-tables.

The herring are packed in cotton-seed oil, mustard sauce, or vinegar with spices. The spices used are usually mustard seed, allspice, cloves, and bay leaves. Vinegar is also used for diluting the mustard sauce. Under the regulations prevailing in 1895, prescribed by State law, not less than one gallon of the preservative should be used to each case of sardines. The quantity seems to have fallen short in some instances, which may be partially explained by the fact that in dipping the oil or other packing materials the rapidity with which the work is done is liable to result in the measures not being completely filled unless considerable care is exercised. The packers first fill the cans, one at a time, with the oil, mustard sauce, or vinegar, as the case may be. For this purpose sealed measures, containing one-hundredth part of a gallon for quarter and one-fiftieth of a gallon for three-quarter cans, are used. Some of the factories use an oiling machine, which fills 25 cans at a time. After the cans have been filled the fish are packed in them in three layers of from three to four fish each. The fish vary from 4 to 6 inches in length. The small ones are packed in the quarter and the large ones in the three-quarter cans. Herring too large for sardines are packed to some extent in vinegar and spices in 3-pound oval and 1-pound round cans. They are also salted in barrels and sold as Russian sardines. These are afterwards repacked in smaller packages by the dealers and the requisite spices added. The final work of the packers is the "heading off" or placing the covers on the cans. The cans are then taken to the sealing room, where the covers are soldered on by the sealers, and are then ready for bathing.

The bath tank is generally separated into two compartments, which are filled with water and heated by steam. The steam is conveyed from the boiler of the engine by iron pipes, which pass around the inside of the tank in a number of coils. The pipe in the tank is perforated, so that the steam may come in contact with the water. Each compartment of the tank is fitted with six coolers or large wire baskets. The cans are placed in the coolers and lowered into the tank, where they are completely submerged in boiling water. The quarter-oil cans are allowed to remain in the bath about one and one-half hours, and three-quarter mustard, or other large cans, about two hours. They are then hoisted out, and the bottoms of the coolers, which are arranged to slide out, are removed, and the cans are released at the head of a chute or screen in the floor which leads down into the testing room. They are first cooled and dried in sawdust, and then shoved down the chute by means of a wooden scraper. The hoisting apparatus by which the coolers are managed consists of a chain gear operated by hand. In some instances the coolers are operated by an ordinary block and tackle; in others coolers are not used, and the cans are removed from

the bath tanks with dip nets made of wire or iron links. In canneries not having engines the tanks are heated by a furnace. When the cans reach the testing-room they are carefully examined or "tested." The covers of the cans are always concaved, so that when they are put on the air is excluded; but it often happens that the soldering is not done perfectly, and as a consequence the oil leaks out, the vacuum becomes filled with air, which expands in the heat of the bath and causes the cover of the can to present a bulged appearance. These are called "swelled heads," and are easily detected by the testers.

An appliance has recently been devised and used by Messrs. George O. Grady & Co., of Eastport, for testing the cans before they are filled. It consists of a cylindrical tank about 5 feet in length and 1 foot in diameter, fixed in an upright position at the end of a table. The tank is filled with water to within about 18 inches of the top by means of a pipe leading from the boiler of the engine. Air is forced through another pipe into the space above the water by the air-pump which supplies air for oxygenizing the flame of the kerosene oil stoves used in soldering. The pressure of air, which requires to be about 12 pounds, and the quantity of water are regulated by steam and water gauges. On the table, a few feet from the tank, is a tin pan or tray, in the center of which is a rubber pad a little larger than a sardine can. A pipe fitted with a valve leads from the tank and passes up through the pad from the under side of the table. The can when tested is placed bottom upward over the nozzle of the pipe and held in position by pressure applied with a lever worked by the foot. The operator then turns a thumb-piece on the pipe, which opens the valve and lets a small stream of water into the inverted can. If it is not perfectly tight the leak is immediately disclosed by the fine jet of water which passes through it. The water, after being used, escapes by a waste-pipe in the tray. One advantage of this method is that it shows which class of solderers has done the poor work, whether the seamers or can-makers, and the defective cans are returned to them for the leaks to be mended, after which they are again tested in a similar manner. If any cans are imperfect after coming from the bath the fault is known to lie with the sealers. An improvement is contemplated by arranging the valve to open with the lever when the pressure is applied, and thus avoid the movement of the hand in turning the thumb-piece. The apparatus costs about \$15, and is operated by one person.

The cans which are discovered to be defective after coming from the bath are culled out and turned over to the leak-menders. The leaks not only have to be mended, but the air allowed to escape and the can refilled with oil. A puncture is made usually on the bottom of the can at one end near the edge. The cover and bottom are then pressed back into their proper concave shape and another puncture is made in a similar place at the opposite end, after which the can is stood endwise in a pan of oil until it is refilled. The punctures are then closed with solder, and the can is again put through the bath. The perfect cans,

after the sawdust and dampness are wiped off, are ready to be packed in the wooden boxes or cases for shipment. In each case there are 100 cans of the quarter or half sizes, or 50 cans of the three-quarter size. The latter, when packed in vinegar and spices, are called "marinees."

*Pomace and oil.*—The "fish cuttings" and refuse fish which accumulate at the canneries are made into pomace and sold for fertilizer. When the herring are cut for sardines the "cuttings," which include the heads and viscera, are first deposited in barrels. They are afterwards removed to the press room and emptied in a heap on the floor, being spread in layers and covered with salt, to prevent them from decomposing. The quantity of salt used is about 3 bushels to 5 barrels of cuttings. After remaining in the salt a short time they are put into three quarter hogshead tubs and thoroughly cooked with steam. The steam is conveyed from the boiler of the engine through a pipe, open at the end, which enters the side of the tub near the bottom. The tubs are kept covered while the fish are cooking. After being cooked, the cuttings are dipped with scoop nets from the tubs into the pomace presses. There are usually two of these presses used in each cannery. They are so arranged that one end can be removed for convenience in taking out the pomace after it has been pressed. The pressure is applied with a jackscrew operated by hand. While the fish are being pressed the oil and water which they contain are carried off into an oil tank by means of an open spout. The pomace, when taken from the press, is packed into barrels which are made for that purpose and hold about 275 pounds each. It is sold largely to farmers in the vicinity at an average of about \$9 per ton. The oil is skimmed off the water in the tanks and put in barrels for shipment. The price received in 1895 was about 14 cents per gallon. The prices for pomace and oil have declined considerably during the past few years.

It requires about 3 hogsheads of fish to yield 1 hogshead of cuttings and 5 hogsheads of cuttings to make 1 ton of pomace. It is generally estimated that the yield of oil to each ton of pomace is from 20 to 23 gallons, but the proportions in which the two products are sold show the average quantity of oil to the ton of pomace to be a little less than 16 gallons.

*Refuse products.*—Refuse fish which are not converted into pomace and oil are either sold by the barrel to the farmers for fertilizer or to a factory which was established at Eastport in 1893 and has since been engaged in the manufacture of various grades of fish fertilizer, chiefly from the refuse or damaged fish obtained at the canneries and smoke-houses in that vicinity. The refuse of tin and soldering coppers and the solder dross are also to a great extent saved and sold.

*Extent of the sardine industry.*—There were 36 sardine canneries operated in 1895, having a value of \$250,500, and the amount of cash capital was \$426,100. There were also 88 collecting boats and lighters used in connection with the canneries, valued at \$32,437, the total investment of fixed and working capital being \$709,037. The number

of persons engaged in the industry, including proprietors, boatmen, and cannery employeés, was 4,404. Of these, 4,172 were employed directly in the canneries and received in wages, during the season of eight months, \$556,440, or an average of about \$69,555 per month. The amount of wages distributed at Eastport, exclusive of the earnings of boatmen, was \$306,448, or an average of \$38,306 per month. At Lubec the average amount distributed per month in wages was \$13,085, and at North Lubec, \$11,711. The cost of materials used in the manufacture of sardines was \$792,292 and the quantity of herring utilized was 36,496 hogsheads, or about 36,496,000 pounds, which cost the manufacturers \$114,504. The total amount paid for wages, materials, and herring was \$1,463,236. It may be proper to explain that this does not fully represent the cost of the herring products, since there are many items of expense which it is impracticable to include.

The number of cases of sardines prepared, including 1,151 cases of plain herring in 1-pound cans, was 682,100, the value of which was \$1,644,526. There were also 1,326 barrels of Russian sardines, valued at \$3,390, and a large quantity of secondary products, having a value of \$18,902, the total value of all classes of products being \$1,666,818. The quantity of products prepared at the canneries in each of the years of 1893 and 1894 was much less than in 1895, but owing to the higher prices received in those years the value of the output was considerably greater. In 1893 there were 530,043 cases of sardines and other canned herring, valued at \$1,724,582; 810 barrels of Russian sardines, valued at \$2,461; and secondary and waste products to the value of \$14,868; the total value being \$1,741,911. In 1894 the number of cases of sardines and other canned herring was 622,487, valued at \$1,862,972; 721 barrels of Russian sardines, valued at \$2,076; secondary and waste products, \$18,366; a total of \$1,883,414.

#### LEGISLATION.

The few laws which have been enacted for the purpose of regulating the sardine industry have, in most instances, been confined in their scope chiefly to provisions for the cleanliness and wholesomeness of the products. Chapter 40, sec. 18, of the Revised Statutes of the State of Maine provides that no sardines shall be canned between the 15th day of December and the 15th day of the following April. An act passed in 1893 forbids the canning of any herring sardines without first beheading and eviscerating them.

In 1895 a law was passed providing that not less than 1 gallon of oil, mustard sauce, or vinegar should be used in packing each case of sardines. Its purpose was to improve the quality of the goods, and also to prevent the exercise of undue economy in the use of oil or other ingredients. There was, however, considerable objection to its provisions on the part of some of the packers, on the ground that if there was a demand for sardines packed with less than 1 gallon of oil they should be allowed the privilege of packing them.



This act was in force during 1895 and 1896, and is as follows:

SECTION 1. In packing herring, mackerel, or other fish in hermetically sealed cans, either in oil, mustard, or vinegar, there shall be used not less than 1 gallon of oil, of good standard quality, for every 100 cans so packed of the size known as one-quarter oils; 1 gallon of mustard sauce of good quality for every 50 cans of the size known as three-quarter mustards and for every 100 cans of the size known as one-quarter mustards; 1 gallon of vinegar for every 100 cans of the size known as one-quarter spiced and for every 50 cans of the size known as three-quarters spiced. Proprietors of fish-packing factories shall provide sealed measures holding one one-hundredth part and one-fiftieth part of a gallon each, which shall be used in measuring all oil, mustard sauce, and vinegar used in packing fish as above provided; and all fish packed as aforesaid shall be, when so packed, good and sound, except that they shall be cleaned, headed, and eviscerated, and of good uniform size.

SEC. 2. Whoever packs or cans, or causes to be packed or canned, any fish in violation of this act shall forfeit \$20 for every 100 cans or 50 cans, as aforesaid, in the case may be, so packed by him or by his employees, to be recovered by complaint.

In 1897 a new law was enacted, in which the provisions of the act of 1895 were modified, and those of the former acts above quoted are, with the exception of a change in the length of the canning season, embraced. The canning season was formerly from April 15 to December 15, but is by the provisions of this act shortened 40 days, beginning May 10 and ending December 1. It is also provided that not less than 3 quarts of oil shall be used in packing each case of "quarter-oil" sardines; 3 quarts of mustard sauce for each case of "three-quarter" and of "one-quarter" mustards, and 1 gallon of vinegar for each case of "one-quarter" and of "three-quarter" spiced or tomato sardines. The full text of the recent law is as follows:

SECTION 1. The commissioner of sea and shore fisheries shall require a strict observation of the following rules: Whoever catches, takes, preserves, sells, or offers for sale any herring for canning purposes less than 8 inches long, measured from one extreme end to the other, or packs or cans sardines of any description between the first day of December and the tenth day of the following May, forfeits \$20 for every 100 cans so packed or canned and for every 100 herring so taken; and whoever bakes, fries, packs, or cans any herring or other fish or sardines without heading and eviscerating the same, and whoever sells, offers for sale, or has in his possession for sale any sardines packed without being so headed and eviscerated, shall forfeit \$20 for every 100 cans so packed, sold, offered for sale, or in possession for sale, to be recovered by indictment or action for debt, one-half to the complainant or prosecutor and one-half to the town in which the offense is committed. In packing herring, mackerel, or other fish in hermetically sealed cans, either in oil, mustard, or vinegar, there shall be used not less than three quarts of oil of the first quality, pure summer or winter cotton oil, or any food oil of equal quality, for every 100 cans so packed of the size known as quarter oils; three quarts of mustard sauce of good quality for every 50 cans of the size known as three-quarter mustards and for every 100 cans of the size known as one-quarter mustards; one gallon of vinegar for every 100 cans of the size known as one-quarter spiced and for every 50 cans of the size known as three-quarter spiced or tomato. Proprietors of fish-packing factories shall provide sealed measures holding one one-hundredth part of a gallon each, which shall be used in measuring all oil into quarter-oil sardine cans, and measures holding one-fiftieth part of a gallon, which shall be used in measuring all mustard sauce and vinegar into three-quarter size cans used in packing sardines; and all fish packed as aforesaid shall, when so packed, be good and sound, except that they shall be cleaned, headed, and eviscerated. Whoever packs or cans, or causes to be packed or canned, any fish in violation of this section shall forfeit \$20 for every 100 cans or 50 cans, as aforesaid, as the case may be, so packed by him or by his employees, to be recovered by complaint.

SEC. 2. All cans shall be decorated, stamped or labeled with quality, packer's name and place of business, or merchant's name for whom the same are packed. All leaks, whether swelled or not, shall be thoroughly mended and filled with oil or vinegar, as per kind of sardines, and then bathed in boiling water for not less than 20 minutes, or in retort, at a temperature of 240 degrees, not less than 5 minutes. Whoever sells or offers for sale any sardines in violation of this section shall forfeit \$1 for every can so sold or offered for sale, to be recovered by action, indictment, or

action for debt, one-half to the complainant or prosecutor and one-half to the town in which the offense was committed.

SEC. 3. No can of sardines shall be packed with less than six fish, and no fish shall be packed as sardines unless they have been headed and eviscerated within 24 hours from the time they arrive at the factory. No fish shall be baked for sardines in ovens unless they shall first be properly flaked in rows and laid on without overlapping. Whoever flakes, bakes, or packs any sardines in violation of this section forfeits \$5 for every 100 fish so flaked, baked, or packed, to be recovered by indictment or action for debt, one-half to the complainant or prosecutor and one-half to the town in which the offense is committed.

SEC. 4. All decorated cans, tin-plate and metal labels now in possession of any packer, and all sardines packed previous to the approval of this act, are exempt from the provisions of the same.

SEC. 5. The commissioner of sea and shore fisheries shall insist upon the strict enforcement of this act and require from his wardens who have jurisdiction in localities where sardine canning factories are located to give a good and sufficient bond, in the sum of \$5,000, to guarantee the faithful and strict enforcement of the provisions of this act and its penalties, and in no case shall a packer of sardines be accepted as a surety.

SEC. 6. The commissioner of sea and shore fisheries, or his deputies, shall inquire into violations of the laws relating to sardines and enforce the penalties thereto, and for the purpose of inquiring into any violation of the said laws and enforcing the penalties thereof, such commissioner, or his deputies, may at all reasonable times enter any manufactory or canning establishment and make investigations concerning the methods employed and the condition of the product, and, if necessary, open packages and cut open cans of sardines for such investigation. Sufficient wardens shall be appointed by the commissioner of sea and shore fisheries to enforce the provisions of this act, and for the city of Eastport and the town of Lubec not less than two each, and one warden each additional for every town where sardines are canned in the State of Maine. No person shall be eligible for appointment as warden who is the owner in a sardine factory or a relative of such an owner.

SEC. 7. All acts or parts of acts that conflict with this act are hereby repealed.

SEC. 8. This act shall take effect when approved.

STATISTICS OF THE HERRING INDUSTRY.

The statistics of the herring industry of the Passamaquoddy region, except those relating to the weir fisheries, which are given in the chapter on that subject, are exhibited in the following series of tables: 1 and 5 show the number and classification of persons engaged in the smoked and pickled herring and sardine industries respectively; 2 and 6, the amount of capital invested, the cost of preparing the products, and the quantity and value of all kinds of products prepared, the four tables making a complete statistical presentation of the extent of these two branches of the herring industry for 1895; 3 and 7 show the quantity and value of herring utilized and products prepared in each of the years 1893 and 1894; 4 shows the various sources from which the herring were derived in 1893, 1894, and 1895.

1. Table showing by localities the number and classification of persons engaged in the smoked and pickled herring industry in 1895.

How engaged.	Eastport and North Perry.		Lubec.		North Lubec.		South Lubec.		Total.		Grand total.
	With canneries.	Independ-ent.	With can-neries.	Inde-pend-ent.	With can-neries.	Inde-pend-ent.	With can-neries.	Inde-pend-ent.	* With can-neries.	† Inde-pend-ent.	
Proprietors.....		21		14		6		38		79	79
General laborers.....	16	60	24	35	7	2		16	47	113	160
Stringers, male.....	12	46	3	43	5	5		16	20	109	129
Stringers, female.....	10	10	9	18	9	10		76	28	114	142
Boatmen.....		26		2		1				29	29
Total.....	38	163	36	112	21	24		145	95	444	539

\* Smoke-houses connected with sardine canneries.

† Smoke-houses independent of sardine canneries.

2. Table showing by localities the extent of the smoked and pickled herring industry in 1895.

Items.	Eastport and North Perry.				Lubec.				North Lubec.				South Lubec.				Total.				Grand total.	
	With canneries.		Independent.		With canneries.		Independent.		With canneries.		Independent.		Independent.		With canneries.		Independent.					
	No.	Value.	No.	Value.	No.	Value.	No.	Value.	No.	Value.	No.	Value.	No.	Value.	No.	Value.	No.	Value.	No.	Value.		
<b>Investment:</b>																						
Smoke-houses.....	10	\$4,230	21	\$14,325	6	\$3,600	17	\$18,340	3	\$1,500	6	\$1,700	26	\$5,927	19	\$9,350	70	\$40,492	89	\$40,842		
Collecting vessels and boats.....			16	7,321			5	1,050			2	260	3	125			26	8,756	26	8,756		
Cash capital.....		5,850		19,240		3,800		12,450		3,000		1,150		4,850		14,650		37,090		52,340		
<b>Total</b> .....		10,100		41,066		9,400		31,840		4,500		3,110		10,902		24,000		86,938		110,938		
<b>Materials, wages, and fish:</b>																						
Bloater shooks.....	6,200	434	15,450	1,145	14,108	943	15,805	1,081	1,600	112	376	20	865	61	21,908	1,489	32,496	2,307	54,404	3,796		
Box shooks.....	272,800	2,721	235,200	2,352	127,917	1,329	329,640	4,107	59,500	632	23,500	242	143,500	1,791	460,217	4,682	731,840	8,492	1,192,057	13,174		
Wood for smoking, cords.....	214	636	273	815	200	698	322	1,139	55	204	30	76	180	509	469	1,541	806	2,583	1,275	4,124		
Salt.....lbs.	720,800	2,169	807,400	2,383	244,000	829	547,500	1,541	94,500	330	72,000	260	124,020	452	1,059,100	3,325	1,550,980	5,136	2,610,080	8,461		
Nails.....lbs.	8,600	270	4,800	191	5,450	173	11,088	390	1,600	59	1,200	46	4,800	190	15,650	496	21,888	817	37,538	1,313		
Barrels.....	1,063	832	6,990	3,496	516	237	1,150	575	30	15	200	100		2,209	1,084	8,340	4,173	10,549	5,257			
Wages.....		7,150		9,711		3,946		5,175		950		212		1,007		12,048		16,105		28,153		
Herring for smoking, hdds.....	2,408	9,438	2,472	8,258	1,630	5,645	3,442	9,183	562	1,579	214	468	1,420	1,644	4,600	16,662	7,546	19,553	12,148	36,215		
Herring for pickling, hdds.....	403	1,435	1,588	6,447	115	325	335	948	8	24	50	100			526	1,784	1,973	7,495	2,499	9,279		
<b>Total cost of preparation</b> .....		25,065		35,300		14,127		24,183		3,889		1,524		5,654		43,111		68,661		109,772		
<b>Manufactured products:</b>																						
Bloaters.....boxes	6,200	3,760	15,450	10,090	14,108	8,074	15,805	8,840	1,600	800	376	202	865	509	21,908	12,634	32,496	19,641	54,404	32,275		
Lengthwise.....boxes	41,600	2,910	28,250	2,043	15,000	1,200	18,500	1,295	7,000	420			1,550	85	63,600	4,530	48,300	3,493	111,900	7,963		
Medium scaled.....boxes	230,700	17,782	199,450	15,912	112,917	8,754	307,640	24,673	52,100	3,952	23,500	1,880	140,500	10,450	395,717	30,488	671,090	52,915	1,066,807	83,403		
No. 1.....boxes	500	30	7,500	415		3,500	175	400	20				1,450	75	900	50	12,450	605	13,350	715		
<b>Total</b> .....	279,000	24,492	250,650	28,460	142,025	18,028	345,445	31,983	61,100	5,192	23,876	2,082	144,365	11,126	462,125	47,702	764,336	76,654	1,216,461	124,356		
Herring pickled.....bbls.	1,863	4,168	6,999	18,349	516	1,828	1,450	4,350	30	90	200	540			2,200	6,087	8,649	23,239	10,858	29,326		
<b>Secondary products:</b>																						
Oil.....galls.			325	50													325	50	325	50		
Pomace.....tons.			31	298													31	298	31	298		
Refuse fish.....bbls.			585	140		855	107				20	4	1,234	220			2,704	471	2,704	471		
<b>Total</b> .....			488			855	107				20	4	220				819		819			
<b>Total value of products</b> .....		28,651		47,297		19,856		39,440		5,282		2,026		11,349		53,789		100,712		154,501		

3. Table showing by localities the products of the smoked and pickled herring industry in 1893 and 1894.

Items.	Eastport and North Perry.				Lubec.				North Lubec.				South Lubec.				Total.				Grand total.	
	With canneries.		Independent.		With canneries.		Independent.		With canneries.		Independent.		Independent.		With canneries.		Independent.					
	No.	Value.	No.	Value.	No.	Value.	No.	Value.	No.	Value.	No.	Value.	No.	Value.	No.	Value.	No.	Value.				
1893.																						
Herring for smoking hds.	1,886	\$11,387	1,732	\$7,871	706	\$3,284	1,845	\$6,354	360	\$1,980	374	\$1,254	882	\$3,546	2,952	\$17,151	4,833	\$19,025	7,785	\$36,176		
Herring for pickling hds.	361	2,267	780	3,640	50	225	23	104			10	30			411	2,492	813	3,774	1,224	6,266		
Total	2,247	14,154	2,512	11,511	756	3,509	1,868	6,458	360	1,980	384	1,284	882	3,546	3,363	19,643	5,646	22,799	9,009	42,442		
Manufactured products:																						
Bloaters.....boxes.	6,800	5,150	4,300	3,605	5,630	4,128	3,220	2,521	1,000	800					13,430	10,078	7,520	6,126	20,950	16,204		
Lengthwise.....boxes.	10,300	1,041	50,500	5,795	650	65	23,600	2,432	5,400	594					50	16,350	1,700	74,600	8,277	90,950		
Medium scaled.....boxes.	192,610	23,662	117,700	16,341	54,000	7,440	184,220	25,103	31,300	4,382	47,000	6,580	89,600	11,757	277,910	35,484	438,529	59,781	716,439			
No. 1.....boxes.		11,700	1,164	2,000	200	9,900	975	1,300	118					5,200	453	3,300	318	26,800	2,592	30,100		
Total	209,710	29,853	184,200	26,905	62,280	11,834	220,949	31,031	38,000	5,894	47,000	6,580	95,300	12,260	310,990	47,360	547,449	76,776	858,439			
Herring, pickled.....bbls.	1,572	7,116	3,800	12,550	200	800	100	250			40	120			1,772	7,916	3,940	12,920	5,712	20,836		
Secondary products:																						
Oil.....galls.			200	44														200	44	200		
Pomace.....tons.			6	48															6	48		
Refuse fish.....bbls.			360	107			456	61					785	154					6	48		
Total			199				61						785	154				1,611	322	1,611		
Total value of products	36,969		39,654		12,630		31,342		5,894	6,700		12,414		55,496		90,110		145,606		414		
1894.																						
Herring for smoking hds.	2,608	14,113	2,602	11,584	2,151	10,572	3,060	12,531	605	2,261	571	1,751	1,093	2,825	5,364	26,946	7,296	28,701	12,660	55,647		
Herring for pickling hds.	326	1,854	868	4,289	23	81	68	267			23	69			349	1,935	957	4,625	1,306	6,560		
Total	2,934	15,967	3,468	15,873	2,174	10,653	3,098	12,798	605	2,261	594	1,820	1,093	2,825	5,713	28,881	8,253	33,326	13,966	62,207		
Manufactured products:																						
Bloaters.....boxes.	11,113	7,519	8,050	5,960	18,726	15,701	18,231	12,902	1,000	500			300	175	30,839	23,720	26,581	19,037	57,420	42,757		
Lengthwise.....boxes.	38,922	3,323	73,750	5,515	14,215	1,100	41,968	3,464	7,000	619	16,000	1,280	1,250	104	60,137	5,062	132,968	10,363	193,125	15,415		
Medium scaled.....boxes.	246,435	19,990	191,150	16,348	137,275	12,283	200,903	24,552	64,700	5,986	52,850	4,815	111,900	10,244	448,410	38,259	616,809	55,959	1,065,213	94,218		
No. 1.....boxes.		16,000	955	7,290	383	7,200	434	2,800	158	200	14	2,200	188	10,060	511	25,600	1,571	35,680	2,112			
Total	296,470	30,842	288,950	28,778	177,476	29,467	328,322	41,382	75,500	7,265	69,050	6,109	115,650	10,691	549,446	67,572	801,972	86,930	1,351,418			
Herring, pickled.....bbls.	1,428	4,180	3,363	9,259	100	250	275	1,038		95	312				1,528	4,440	3,673	10,699	5,201	15,049		
Secondary products:																						
Oil.....galls.			300	46														300	46	300		
Pomace.....tons.			12	108														12	108	12		
Refuse fish.....bbls.			745	214			570	70					1,120	209					12	108		
Total			368				70						209					2,435	493	2,435		
Total value of products	35,032		38,405		29,717		42,460		7,260	6,421		10,900		72,012		98,186		170,188		647		

NOTE.—"Tucktails," being limited in quantity, are not shown separately in the tables, but are included with the regular grades of smoked herring.

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4. Table showing the sources from which the herring were derived in 1893, 1894, and 1895.

Sources.	1893.		1894.		1895.	
	Hhds.	Value.	Hhds.	Value.	Hhds.	Value.
<i>Quoddy Bay and tributaries.</i>						
American weirs:						
Herring for sardines.....	6,412	\$41,101	5,147	\$23,470	3,707	\$11,308
Herring for smoking.....	3,614	14,227	4,809	17,483	5,312	10,451
Herring for pickling.....	386	1,590	121	520	591	1,670
Total.....	10,412	56,918	10,077	41,473	9,610	23,427
Canadian weirs:						
Herring for sardines.....	22,910	143,027	28,804	131,061	32,724	102,970
Herring for smoking.....	3,267	18,120	4,642	22,329	4,363	15,477
Herring for pickling.....	328	2,146	362	1,971	1,208	4,559
Total.....	26,505	163,293	33,808	155,361	38,295	123,006
<i>Machias Bay and vicinity.</i>						
Herring for sardines.....	18	144	2	4	65	228
Herring for smoking.....	235	896	706	2,585	626	1,625
Herring for pickling.....	500	2,500	800	4,000	970	2,980
Total.....	753	3,540	1,508	6,589	1,361	4,833
<i>Grand Manan.</i>						
Herring for smoking.....	483	1,769	1,202	4,137	905	2,253
Herring for pickling.....	10	30	23	60	30	70
Total.....	493	1,799	1,315	4,206	935	2,323
<i>Magdalen Islands.</i>						
Herring for smoking.....	40	250	813	5,361	708	4,069
<i>Newfoundland.</i>						
Herring for smoking.....	140	914	398	3,752	174	1,740
Grand total.....	38,349	226,714	47,910	210,742	51,143	159,098

5. Table showing by localities the number and classification of persons engaged in the sardine industry in 1895.

How engaged.	Eastport.	Lubec.	North Lubec.	Robbinston, North Perry, and Pembroke.	Total.
Proprietors.....	28	14	13	9	64
Clerks, male.....	9		3	2	14
Clerks, female.....	1	1			2
Foremen.....	34	10	5	10	59
Tin-cutters, rimuvers, benders, etc.....	87	38	31	16	172
Seamers, can-makers, and sealers.....	686	227	211	125	1,249
Cutters, male.....	338	53	54	97	542
Cutters, female.....	248	52	48		348
Flakers, male.....	72	37	51	17	177
Flakers, female.....	82			28	110
Bakers and helpers.....	20	12	11	5	48
Packers, female.....	418	178	151	103	850
Bathmen, testers, and nailors.....	84	32	24	11	151
General laborers.....	261	73	78	38	450
Boatmen.....	93	27	32	16	168
Total.....	2,401	754	712	477	4,404

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6. Table showing by localities the extent of the sardine industry in 1895.

Designation.	Eastport.		Lubec.		North Lubec.		North Perry, Robbinston, and Pembroke.		Total.	
	No.	Value.	No.	Value.	No.	Value.	No.	Value.	No.	Value.
<b>Investment:</b>										
Canneries .....	17	\$134,800	7	\$49,200	7	\$46,000	5	\$20,500	36	\$250,500
Vessels, boats, and lighters.....	53	21,112	13	5,350	12	3,275	10	2,700	88	32,437
Cash capital.....		275,100		50,000		63,500		28,500		426,100
<b>Total</b> .....		431,012		113,550		112,775		51,700		709,037
<b>Materials, wages, and fish:</b>										
Shooks for cases...	367,584	26,191	146,675	10,229	111,300	7,968	58,300	4,095	683,850	48,483
Plain tin...boxes...	34,365	116,226	12,410	42,474	9,757	32,427	5,800	19,625	62,832	210,752
Oil tin (decorated), boxes	12,856	66,020	4,024	20,868	3,193	16,520	2,066	10,743	22,139	114,151
Mustard tin (decorated)....boxes...	2,328	23,403	1,508	15,720	1,152	11,390	342	3,485	5,420	54,004
Pig tin.....lbs.	415,924	61,210	154,641	23,376	129,481	19,566	76,101	11,615	776,147	115,767
Pig lead.....do.	602,856	22,382	232,660	8,514	184,981	6,555	105,410	4,217	1,125,907	41,668
Soldering fluid, lbs.	126,635	2,099	66,000	1,138	36,500	609	20,500	343	240,635	4,189
Cotton-seed oil, galls.	248,638	72,173	89,833	26,875	68,953	20,842	46,200	13,937	453,624	133,827
Mustard.....galls.	63,735	8,644	50,352	7,016	29,630	4,035	9,700	1,370	153,417	21,065
Vinegar.....galls.	3,684	370	6,500	553	13,304	1,036	1,800	112	24,788	2,070
Spices.....lbs.	225	14			839	73			1,064	87
Kerosene oil, galls.	60,857	5,352	14,000	1,290	18,400	1,100	4,050	365	92,307	8,167
Wood.....cords.	258	694	107	452	103	204	117	281	645	1,691
Coal.....tons.	1,814	6,348	557	1,958	448	1,678	220	965	3,045	10,940
Coke.....tons.	85	522	135	775	98	620	35	233	353	2,150
Soldering coppers, cases	223	4,245	96	1,823	62	1,203	41	700	422	8,061
Nails.....lbs.	75,200	2,195	20,350	587	17,906	522	9,900	326	123,356	3,630
Salt.....lbs.	1,814,815	6,305	640,050	2,104	494,800	1,688	237,400	797	3,188,565	10,984
Barrels for Russian sardines....	413	153	813	389			100	55	1,326	597
Wages.....		306,448		104,677		93,690		51,625		556,440
Herring.....hhd.	18,097	61,671	8,129	23,565	5,988	18,298	3,440	10,950	30,490	114,504
<b>Total cost of preparation</b> .....		792,665		294,493		240,149		136,929		1,463,236
<b>Manufactured products:</b>										
<b>Sardines in oil:</b>										
Quarters.....cases...	275,863	686,828	89,823	224,874	67,453	107,853	46,200	112,050	470,339	1,191,605
Halves.....cases...	1,215	5,703			1,000	4,650			2,215	10,353
<b>Sardines in mustard:</b>										
Quarters.....cases...	5,668	16,853			3,000	8,250			8,668	25,103
Three-quarters, cases.....	80,035	177,147	56,852	121,776	38,844	83,214	12,100	25,290	187,831	407,480
<b>Sardines in spices:</b>										
Three-quarters, cases.....	1,896	4,312			1,000	2,500			2,896	6,812
<b>Plain herring:</b>										
One pound round, cases.....	1,151	3,223							1,151	3,223
<b>Russian sardines, bbls.</b> .....	413	978	813	2,187			100	225	1,326	3,890
<b>Total</b> .....		895,044		348,840		266,467		137,565		1,647,916
<b>Secondary and waste products:</b>										
Oil.....galls.	14,891	2,175			425	63	2,475	340	17,791	2,584
Pomace.....tons.	910	8,825			35	280	180	1,775	1,123	10,380
Refuse fish.....bbls.	10,194	878	6,400	640	5,400	560	500	75	22,494	2,148
Refuse tin.....lbs.	41,200	406	39,000	195	21,591	111	6,000	15	107,791	727
Refuse coppers, lbs.	14,361	675	3,875	186	4,129	165	1,350	54	23,215	1,074
Copper filings, lbs.	4,510	191	1,570	65	3,200	180	575	22	9,855	408
Solder dross.....lbs.	19,342	806	11,515	392	12,734	338	1,400	45	44,991	1,581
<b>Total</b> .....		13,451		1,472		1,647		2,832		16,902
<b>Total value of products</b> .....		908,495		350,312		268,114		139,897		1,668,816

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7. Table showing by localities the products of the sardine industry in 1893 and 1894.

Designation.	Eastport.		Lubec and South Lubec.		North Lubec.		North Perry, Robbinston, and Pembroke.		Total.	
	No.	Value.	No.	Value.	No.	Value.	No.	Value.	No.	Value.
1893.										
Herring utilized.....hhds..	15,180	\$80,062	7,556	\$45,029	5,179	\$39,200	1,425	\$9,775	29,340	\$184,272
Manufactured products:										
Sardines in oil—										
Quarters.....cases..	200,842	684,175	93,075	320,123	50,875	200,008	21,050	73,250	374,752	1,280,556
Halves.....cases..	3,700	6,161	.....	.....	500	2,435	.....	.....	4,200	8,590
Sardines in mustard—										
Quarters.....cases..	5,907	20,267	.....	.....	1,600	5,600	.....	.....	7,507	25,867
Three-quarters.cases..	63,900	177,597	41,597	114,393	33,008	93,460	3,450	10,313	141,955	395,763
Sardines in spices—										
Three-quarters.cases..	800	2,480	.....	.....	500	1,375	.....	.....	1,300	3,855
"Sea trout" (herring)—	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Three-lb. ovals.cases..	110	357	.....	.....	.....	.....	.....	.....	110	357
Plain herring—										
One-lb. round...cases..	210	588	.....	.....	.....	.....	.....	.....	210	588
Russian sardines..bbis..	569	1,507	301	954	.....	.....	.....	.....	810	2,461
Total.....	.....	893,132	.....	441,470	.....	308,878	.....	83,503	.....	1,727,043
Secondary and waste products:										
Oil.....galls..	11,000	2,278	827	177	400	80	950	100	13,177	2,725
Pomace.....tons..	680	0,328	58	486	25	213	65	640	828	7,687
Refuse fish.....bbis..	5,710	484	5,850	585	4,900	490	200	60	16,760	1,619
Refuse tin.....lbs..	25,700	127,39	316	173	5,600	28	.....	.....	70,616	328
Refuse coppers.....lbs..	10,773	535	3,040	220	3,180	147	750	30	17,099	930
Copper filings.....lbs..	1,600	81	1,943	107	2,484	118	806	12	6,327	318
Solder dross.....lbs..	13,684	619	9,860	376	6,460	248	1,250	88	30,734	1,281
Total.....	.....	10,460	.....	2,124	.....	1,324	.....	970	.....	14,868
Total value of products.....	.....	903,582	.....	443,594	.....	310,202	.....	84,588	.....	1,741,911
1894.										
Herring utilized.....hhds..	18,547	95,019	7,208	33,450	5,103	21,171	3,095	14,295	33,453	164,535
Manufactured products:										
Sardines in oil—										
Quarters.....cases..	264,004	799,542	81,001	261,296	59,324	190,022	42,350	124,788	447,279	1,381,648
Halves.....cases..	3,040	15,310	.....	.....	500	2,435	.....	.....	3,540	17,751
Sardines in mustard—										
Quarters.....cases..	9,233	30,476	.....	.....	1,600	5,600	.....	.....	10,833	30,076
Three-quarters.cases..	71,911	188,358	40,265	122,778	28,843	80,109	10,050	28,100	167,069	417,839
Sardines in spices—										
Three-quarters.cases..	1,871	4,992	.....	.....	500	1,375	.....	.....	2,371	6,367
"Sea trout" (herring)—	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Three-lb. ovals.cases..	208	624	.....	.....	.....	.....	.....	.....	208	624
Plain herring—										
One-lb. round...cases..	1,187	3,167	.....	.....	.....	.....	.....	.....	1,187	3,167
Russian sardines..bbis..	235	570	446	1,406	.....	.....	40	100	721	2,076
Total.....	.....	1,043,045	.....	385,480	.....	285,555	.....	150,988	.....	1,865,048
Secondary and waste products:										
Oil.....galls..	14,130	2,238	.....	.....	950	148	2,180	356	17,260	2,737
Pomace.....tons..	918	8,263	.....	.....	65	520	163	1,605	1,146	10,388
Refuse fish.....bbis..	9,472	932	6,300	630	8,800	386	425	85	19,997	2,027
Refuse tin.....lbs..	37,950	368	30,300	181	8,400	42	4,000	10	69,650	591
Refuse coppers.....lbs..	16,121	656	2,903	178	1,700	74	800	39	21,524	942
Copper filings.....lbs..	1,995	92	1,697	76	1,390	80	825	13	5,347	241
Solder dross.....lbs..	23,474	836	8,828	302	7,400	287	400	15	40,202	1,440
Total.....	.....	13,375	.....	1,862	.....	1,506	.....	2,123	.....	18,360
Total value of products.....	.....	1,056,420	.....	386,842	.....	287,041	.....	153,111	.....	1,589,414