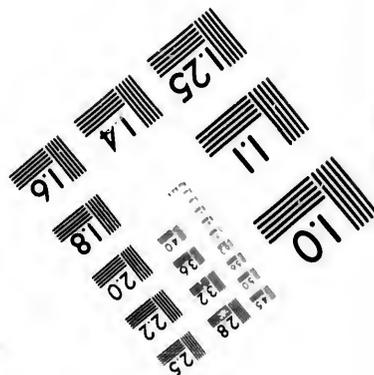
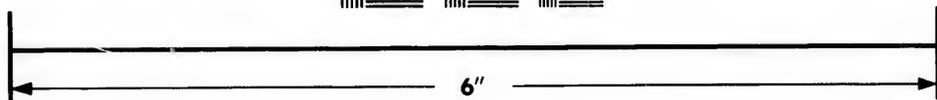
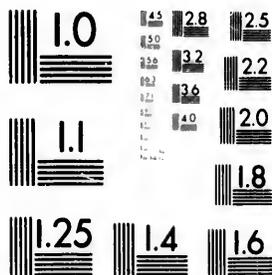


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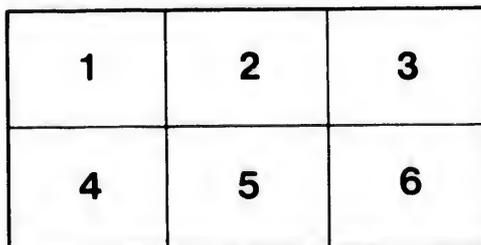
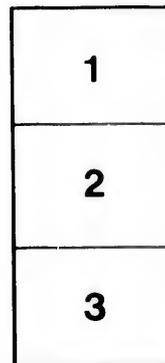
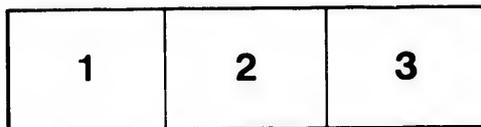
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A PAPER READ BEFORE THE
British Association for the Advancement of Science.
MONTREAL MEETING, 1884.

THE FISHERIES OF CANADA

BY L. Z. JONCAS,

Commissioner to the London Fisheries Exhibition, Sheriff of Gaspe, Quebec.

"The late Professor SPENCER F. BAIRD once told me that the quantity of fish taken from the ocean for the supply of human wants was literally no more than equal to a drop in a bucket of water, compared to the multitude of fish which the multitudinous seas stand ready to give up to our use. Could these fish be diverted IN THE WATER from the shores of Canada to the harbors of New England, should we erect a barrier at the mouth of every harbor to prevent them from entering at full measure? If not, why do we erect a barrier to prevent their being brought UPON the water?"—EDWARD ATKINSON.

"The commercial products obtained from the sea are more numerous and important than would be generally supposed by those who have not looked closely into the matter. * * * * * The sea is more abundantly stocked with living creatures than the land. It is filled with animals of several kinds, and each layer of water in depth, seems to have its own varieties, thus resembling the changes which take place, according to elevation, in the organized portion of the land. The animals are among the mightiest and among the smallest."—P. L. SIMMONS, "Commercial Products of the Sea."

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In view of the interest manifested in the question of Commercial Union of North America, and the important place which the Fisheries of Canada occupy, as a part of that question ; and also their relation to the complications which have arisen between the United States and Great Britain and Canada, an intelligent description of the Canadian Fisheries will be an important addition to the literature of the hour. This is happily found in the contribution by Mr. SHERIFF JONCAS, of Gaspe, Quebec, to the papers of the British Association for the Advancement of Science, which is submitted herewith. The simplicity and intelligence of the paper is only exceeded by its comprehensiveness.

If, among the many great benefits which would follow in the train of Commercial Union, free access could be had to the vast fishery wealth of the Dominion by the people of the United States, on the one hand, and, on the other hand, a market be created for this important asset in the wealth of Canada, whereby the products of the sea could be made more available, the sustentation of human life could be greatly cheapened, and a most beneficial result would be achieved.

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THE FISHERIES OF CANADA.

By L. Z. JONCAS, Sheriff of Gaspé, Quebec.

I. EXTENT OF CANADIAN FISHERIES.

I am not afraid of saying too much, when I assert that the Dominion of Canada owns *the largest and the richest fisheries in the world*. "As a national possession," says the Hon. Peter Mitchell, who was our Minister of Marine and Fisheries in 1870, "they are inestimable; and, as a field for industry and enterprise they are inexhaustible. Besides their general importance to the country as a source of maritime wealth and commerce, they also possess a special value to the inhabitants. The great variety and superior quality of the fish products of the sea and inland waters of Canada afford a nutritious and economical food, admirably adapted to the domestic wants of a mixed and laborious population. They are also in other respects specially valuable to such of our people as are engaged in maritime pursuits, either as a distinct industry or combined with agriculture. The principal localities in which fishing is carried on, do not usually present conditions favorable to husbandry. They are limited in extent and fertility, and are subject to certain climatic disadvantages. The prolific nature of the adjacent waters, and the convenience of their undisturbed use, are a necessary compensation for defects of soil and climate. On such grounds alone, the sea and inland fisheries to which British subjects have claims on this continent are of peculiar value."

To this statement of one of our most prominent public men, I will merely add a few words, to show more clearly what an immense field is opened by our fisheries, not only for the industry of our own population, but for the enterprise of our neighbors, a field capable of sustaining three or four times as large a population as that of Canada at the present moment. Canada is equal in extent to the republic of the United States; it is almost as large as the whole continent of Europe; that is to say, it contains about one-fourteenth of

the land of the world. Bounded by three oceans, it has, besides its numerous inland seas, over 5,500 miles of sea coast, washed by waters abounding in the most valuable fishes of all kinds. Setting aside for the moment the 3,000 miles of sea coast in British Columbia, and the immense inland seas of the great Northwest Territory,—the richness of which has not been properly utilized, and is not yet well known,—we have, in the old Provinces of the Confederation, 2,500 miles of sea coast, and inland seas covering an area of 122 square miles; besides a considerable number of lakes of smaller extent, and many important rivers, teeming with varieties of fishes of great commercial value.

From whatever point of view we may regard them, the teeming waters of the British American possessions, and those which form their great lakes and magnificent rivers, must be reckoned as a national property, richer and more perpetual than any mere estimate in money can express. "It is in the highest degree satisfying," observes the Hon. Peter Mitchell, in his above mentioned Report, "to find that Canadians are becoming every year more and more alive to the vast importance of their fisheries, and that they are now more than ever anxious to preserve them as the finest material portion of our colonial heritage."

The fact of foreign nations having always clung with tenacity to every right and common liberty which they have been enabled to secure in these fisheries, and the eagerness which foreigners manifest to establish themselves in the actual use of such extensive and lucrative privileges, constituting the best extrinsic evidence of the wide-spreading influence of their possession, and the strongest testimony to their industrial and commercial worth.

II. VALUE OF CANADIAN FISHERIES.

I may, perhaps, be asked, whether the richness and the value of the Canadian fisheries are in proportion to their extent. Our fisheries, on account of the insufficiency of our population, are far from having acquired all the development of which they are capable; their annual yield, however, if we take into consideration the number of men actively and regularly employed in working them; and compare them with foreign fisheries of the same nature, proves that they are the richest and the most productive in the whole world. As our population grows, and as

we are able to devote more attention to this industry, the increase in the value of our fisheries will be proportionately very great.

Professor Brown Goode, American Commissioner at the London Fisheries Exhibition in 1883, in one of his speeches at the Fishery Congress in connection with the Exhibition, referred to the immense growth of the Canadian fisheries, during the last ten years. He declared that in the course of his own studies, he had occasion each year to peruse the Canadian reports, and had been "perfectly amazed" at the rapidity with which this industry had been developed. In fact, if we consult the statistics so carefully collected every year by our fishery officers, these official figures will show that the value of the Canadian fisheries, which in 1870 was only \$7,573,000, had doubled during the succeeding ten years, and amounted in 1880 to \$14,500,000. And if we open the last official Report, published by the Department of Marine and Fisheries, we shall see that the same fisheries produced in 1883 the sum of \$17,500,000, representing an increase in value of three millions of dollars in three years.

Although our system of inspection is effective, although the organization of the outside service of our Department of Marine and Fisheries, and our method of collecting fishery statistics, are given as models to other countries, yet they are susceptible of many improvements. It is easy to understand that in such an extensive country as Canada, where every settler has facilities for fishing, it is utterly impossible for our statisticians to impart a mathematical precision to their Reports, or to give accurately the value of the home consumption. * * * * *

The returns of the total catch in the Island of Cape Breton, we hear from good authority, are much below the actual figures. The same thing may be said of Nova Scotia, New Brunswick, Quebec, and British Columbia, where the value of the fisheries is certainly not accurately represented by the figures given.

The \$17,500,000, mentioned above as the value of the Canadian fisheries in 1883, cannot therefore be anything else than the value of the fish prepared for exportation or sold on the Canadian markets. In that amount cannot be included the \$5,000,000, the approximate value of the fish caught and consumed by the native population of Manitoba and British Columbia. And in the other

provinces of the Dominion, with a population of over 4,000,000 inhabitants, for whom fish is one of the principal articles of diet, the estimated value of the fish consumed is \$12,000,000. If, therefore, we add together the value of the fish cured for the trade, and that of the fish captured for local consumption, we have, for 1883, a grand total of \$34,500,000. These figures speak for themselves, and give an idea of the immense richness of the Canadian waters.

Great Britain and the United States, like Canada, have very extensive and very productive fisheries; and by way of further demonstration of the richness of our waters, we may draw a comparison between their products and those of the Canadian fisheries. We have in Canada 50,000 men regularly employed in the fisheries. Their labor, as shown by the last official returns, has produced \$17,500,000, or \$350 for each fisherman. Great Britain, for the working of her fisheries, employs 113,640 men, and their labour, according to the figures given by the Duke of Edinburgh, in his very interesting essay on the British fisheries, produces annually 615,000 tons of fish, representing a value of \$35,000,000, or \$308 for every fisherman; showing a difference in favor of the Canadian fisheries of \$42 for each fisherman.

The statistics of 1882 show that 132,000 men were employed in the fisheries of the United States. The labor of these men produced \$44,500,000, or \$337 for each man, yielding a difference, in favor of the Canadian fisheries over those of the United States, of \$13 for every fisherman. It may be here observed that no inconsiderable portion of the fish taken by the United States fishermen has been caught in the Canadian waters.

It must be added that, in this comparison, I put aside 3,000 miles of sea-coast on the Pacific ocean, the richness of which is still unknown to us and for which we have no statistics; because this vast field, as well as the numerous inland seas flowing towards the Arctic ocean, could not, for want of hands, be worked till now. We have statistics for about one-half of the extent of our fisheries, and it is that half only which is here compared with the whole fisheries of Great Britain and of the United States. It must also be noted, that on account of the severity of our climate, our fisheries can only be worked during about seven months of the year, while the American and Englishman fish all the year round; so

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that the Canadian fisherman earns, in seven months, \$42 more than the English fisherman, and \$13 more than the fisherman of the United States, both of whom work from January to December.

What I have just said, is a sufficient justification of my assertion, that the Canadian fisheries are the richest in the world. And yet, in this comparison, I have said nothing of the perfection of the fishing implements used by the fishermen of the neighbouring Republic and of Great Britain. Nor have I mentioned the large sums spent by them in the building of continually improved fishing crafts, or of the millions expended by their Governments in the buildings of piers, break-waters or other improvements for the protection of the fishing industry. In 1882, besides about 1,000 decked vessels, the total tonnage of which was not more than 40,000 tons, we had to work our sea-fisheries with nothing else but small open boats, well made, solid built, good sailers, perhaps the best of their class; but with which our fishermen, although hardy and skilful, cannot venture very far out at sea, cannot follow the fish in its frequent migrations, and, in consequence, cannot give to our fisheries all the extension of which they are capable. On the other hand, the American fishing fleet numbers, besides many thousand smaller boats, 6,000 schooners of 209,000 tonnage; and the British fishing fleet is composed of 33,000 vessels; most of them of large size, and many of them steamboats. No necessary expense is considered too large by the fish merchants and ship-owners of those countries, and their fishermen, manning convenient and safe boats, can follow the fish everywhere.

The English and United States Governments, and the capitalists of those countries, understanding what an important contribution their fisheries are to the national wealth, encourage by every possible means those who carry on that industry. Fishery Bureaux, headed by their most eminent, influential, and practical men, are formed to seek for the best means of rendering their fisheries more and more productive. Notwithstanding all these encouragements, the statistics prove that the fisheries of Canada are more productive than those of Great Britain or America.

I am happy to be able to state that, owing to the encouragement lately given by our public men, the building of Canadian fishing crafts has progressed rapidly. The swift schooners of our Maritime Provinces, can already compete fairly with American fishing

vessels, reputed the best of their class in the world. Steamers, which are now used in the fisheries on our lakes, will doubtless be seen soon among the vessels used for the working of our most important sea fisheries. Considerable sums of money are spent every year, by our Government, on the building of harbors of refuge and of lighthouses for the guidance of the fishermen. Last year \$150,000 were paid to our fishermen, and if our public men are willing to continue to help the advancement of an industry, which for the future of the Dominion is so highly necessary and important, we may hope that, in the near future, we shall have no reason to envy our brothers beyond the sea, or our rich neighbors.

"The incalculable importance," says a writer in the *Montreal Gazette*, "of such invaluable fisheries in colonization, in the development of commerce, in adding to the country's food produce for home consumption, and for the training of skilled seamen for naval and merchant marine, are points which the histories of all great maritime nations amply demonstrate. The histories of France, Holland, and Great Britain are striking illustrations of the vast national benefits derived from the prosecution of sea fisheries. What but the rough experience of British fishermen in prosecuting their labors on one of the roughest coasts of the world, has made the skill and bravery of British seamen, at once the admiration of all nations, and the dread of their foes. It is rough experience that makes a sailor, and it is just such experience that has enabled the seamen of the Maritime Provinces of Canada to take a first place for skill and coolness among their fellow subjects of the British Isles."

III. A QUESTION.

The question here arises: Would not the Canadian fisheries soon be exhausted if they were worked on a much larger scale; and would it be wise to sink a larger amount of capital in their improvement? It seems to be admitted by all those who have made a special study of this important question, that fresh-water fisheries, such as salmon, trout, white-fish, etc., and also the sea shell fisheries, such as oysters and lobsters, can be, with time, exhausted by indiscriminate fishing. This is generally understood, and our inland fisheries, protected by wise regulations, will continue for years to come to enrich those who work them.

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As to those fishes, which, like cod, mackerel, herring, etc., are the most important of our sea fishes; which form the largest quota of our fish exports and are generally called commercial fishes,—without going so far as to pretend that protection would be useless to them,—I say that it is impossible, not merely to exhaust them, but even noticeably to lessen their number by the means now used for their capture, especially if, protecting them during the spawning seasons, we are contented to fish them from their feeding grounds. For the last three hundred years, fishing has gone on in the Gulf of St. Lawrence and along the coast of our Maritime Provinces, and although enormous quantities of fish have been caught, there are no indications of exhaustion.

In England, a Royal Commission, under the presidency of Professor Huxley, and composed of the most eminent learned men of the United Kingdom, have made a serious and thorough study of this question, and these gentlemen declare that, notwithstanding the enormous and continually increasing quantities of fish caught annually along the coasts of Great Britain, the English fisheries show no sign of exhaustion. In presence of these facts, and relying on the reports and studies of many eminent and practical men, we may infer that, unless the order of nature is overthrown, for centuries to come our fisheries will continue to be fertile and productive.

Messrs. Hatton and Hervey, in their interesting "History of Newfoundland," say: "The Arctic current which washes the coasts of Labrador, Newfoundland, Canada and part of the United States, chilling the atmosphere, and bearing on its bosom huge ice-argosies, is the source of the vast fish-wealth which has been drawn on for ages, and which promises to continue for ages to come. Wanting this cold river in the ocean, the cod, seals, herring, mackerel, halibut, etc., which now crowd the northern seas, would be entirely absent. The great fishing interests are thus as dependent on the Arctic current as the farming interests on the rain and sunshine which ripens the crops." The writers add that "the cold current brings with it the food on which these fish thrive, and *the supply is one that can never fail.*"

The Arctic seas, and the great rivers which they send forth, swarm with minute forms of life, constituting, according to Professor Hind, in many places a living mass, a vast ocean of living

slime. The all-prevading life, which exists there, affords the true solution of the problem which has so often presented itself to those engaged in the sea fisheries, viz., the source of the food which gives sustenance to the countless millions of fish that swarm upon the coasts of Labrador and Newfoundland and the Dominion and United States waters. Dr. Brown has shown that the presence of this slime, spread over one hundred thousand square miles, provides food for myriads of birds that frequent the Arctic seas in the summer, and also furnishes sustenance to the largest marine animals up to the giant whale. By far the largest area of this cold water subtends the coasts of the British American Provinces within the hundred fathom line of soundings. It is computed that while the cold water area subtending the United States is about 45,000 square miles, that subtending the British American shores is 200,000 square miles. To this fact is traced the superior value of the fisheries of British North America.

The old theory regarding the extended migrations of the cod, the herring, etc., to the Arctic or other distant regions and back is now entirely exploded. These fishes are known to be local in their habits, and to be confined to a limited area in their movements. These are governed by the presence or absence of food, their spawning instincts, and the temperature of the water. The law which governs fish life is, that they return to the place of their birth for reproductive purposes. Hence, all round the coast there are, at different places, what may be called colonies of fish, differing from each other, and each having a range of movement from the deep to the shallower waters and *vice versa*. To the spot where the young first issued from the ovum they return, when mature, to repeat the story of their birth. Further, in passing from the spawning grounds to the deeper waters where they spend the winter, the cod and other fish follow a definite line of migration, and generally the shortest and most direct route. Thus the fishes taken along any stretch of coast line, are really indigenous to the adjacent sea area.

IV. OUR MOST IMPORTANT FISHING GROUNDS.

The fisheries of Canada may be divided into two great classes: the deep-sea fisheries; and the fresh-water, or lake and river fisheries. We shall give the precedence to the former as being

affords the true most important. Only about one-half of our five thousand miles of sea coast has till now been properly worked. We do not know yet all the riches of the British Columbia waters, but we can infer, from reading the official report, that they are teeming with a great variety of commercial fishes. Our most important deep-sea fishing-grounds are the Atlantic coast of Nova Scotia, from the Bay of Fundy, around the southern part, around the coasts of Cape Breton, New Brunswick and Prince Edward Island; embracing the Bay of Chaleurs and the Gaspe coast, and extending to the Island of Anticosti, the Labrador and the Magdalen Islands. "There is probably no part of the world," says P. L. Simmons, in his valuable work on the Commercial Products of the Sea, "where such extensive and valuable fisheries are to be found as within the Gulf of St. Lawrence. Nature has bountifully provided within its waters the utmost abundance of those fishes which are of the greatest importance to man, as affording not only nutritious and wholesome food, but also the means of profitable employment."

V. THE COD FISHERY.

Of all the deep-sea fisheries of Canada, the most important is the cod fishery, which furnishes employment to thousands of men, and contributes most largely to our exportation trade. It is one of the leading industries in Nova Scotia, New Brunswick, and the lowest part of the Province of Quebec.

The quantity of codfish taken by the Canadian fishermen, and prepared for the trade last year, was 1,611,596 quintals, representing a value of \$6,366,000. To this must be added 245,453 lbs. of cod and hake sounds, and 333,310 gallons of cod oil, valued at \$225,555; making a grand total of \$6,591,555, divided as follows between the different Maritime Provinces:—

Nova Scotia, - - - - -	\$3,977,599
Quebec, - - - - -	1,778,290
New Brunswick, - - - - -	716,496
Prince Edward Island, - - - - -	119,170
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	\$6,591,555

The cod appears on the Canadian coasts at uncertain dates, generally between the middle of May and the beginning of June,

sometimes in the latter end of the month of April. Local variations in the time of its arrival, amounting to days, and even weeks frequently occur, and these are dependent on the temperature, which determines the movement towards land of the various forms of marine life on which the cod feeds. "It has some favourite spots," Dr. Fortin remarks, "where it is found in greater quantities. These are the places which present the best advantages for the preservation and hatching of the spawn. Having deposited its spawn, it withdraws to shallow places called banks, where it always finds food in sufficient quantity to satisfy the well known voracity of its appetite." About the month of December, the codfish appear to leave the shallow soundings and the banks inshore, and go farther out at sea.

The cod-fishing season varies with the different Provinces, beginning earlier in Nova Scotia and New Brunswick, where the climate is not quite so severe as in the Province of Quebec. From April to November inclusive may be given as an average time. The arrival of the cod on the coasts in the spring is heralded, first by the herring, and secondly by the caplin. The latter is a small fish, the favourite food of the greedy cod, and therefore the best fishing bait. In every large fishing establishment, during all the month of June, two or three boats, each of them manned by seven men, called *seiners*, are employed, day and night, in going about the coast in search of the caplin. When they meet with a shoal of these fish, they cast the seine, load their boat, and hasten home to distribute these little fish amongst the fishermen. Each cod-fishing boat receives an equal share of the fish thus brought by the seiners. Vessels engaged in fishing on the Banks, run into the harbors at intervals for fresh supplies of caplin as bait, which they preserve in ice.

Some idea of the immense shoals of caplin that fill the bays, may be formed from the fact that a man standing ashore, with a casting net, will often fill a cart in less than an hour. With small seines, a couple of men can fill a small boat in about the same time. If any means could be devised to cure them like sardines, which they resemble, caplin would become of considerable commercial value, as they have a very delicate flavour when fresh. In some parts of the Dominion a considerable quantity is dried, packed up in small boxes and sent to some of the United States

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markets. After the caplin has disappeared from the coasts, about the end of June, the launce, the herring, the mackerel, the squid, the smelt, the clams, etc., are used as bait for the cod.

Our cod being mainly taken by hand-lines, and *bultows* or set-lines, the cost of bait for cod-fishing is great. It is certainly not an exaggeration to estimate the actual cost of bait at one-fourth of the value of the cod taken. Besides this, much time is lost every year during the fishing season, owing to want of fresh bait, which is not always easily procured, and which is essential to good fishing. Hence, anything that should economize the cost of bait and save time, would be both desirable and important. Norway, the most important of the cod-producing countries of Europe, and our chief rival in the cod markets of the world, by the aid of science, has in recent years greatly improved her modes of fishing, her fishermen using gill-nets to a large extent and with great success. Why do we not imitate such a good example?

According to recent statements, of 26,000 fishermen engaged in cod-fishing off the Lofoden islands, 12,000 fished with gill-nets; and fishing with nets has proved to be much more productive than fishing with set-lines or bultows. A paper of Gloucester (U. S.) records that on December 12th, 1882, a fishing boat, with two men and seven of these nets, took 5,000 fish in a single night. Mr. James Feehan, of Prince Edward Island, stated that "in his hands gill-nets have worked admirably, to the extent of two dory loads of fish per day." Let us, therefore, hope that gill-net fishing, so remunerative in other countries, will soon be largely used in Canada, and thus save time and the waste of a large quantity of herring, mackerel, and other fishes now used for bait.

The cod fishery is carried on in Canada, either in vessels of a tonnage from 60 to 100 tons on the Great Banks, or in open boats at a few miles from the shore. Nova Scotia and New Brunswick seem to have the monopoly of the fishing in large decked vessels, and I am happy to say that naval architecture has improved very much, during the last ten years, in these two Provinces; and this improvement in the dimensions and lines of their vessels, has enabled their fishermen to increase their annual catch of fish considerably.

Vessels employed in cod-fishing are manned by from ten to thirteen men, according to their tonnage. Generally the owner

of the schooner, who also supplies the men with all the necessary fishing tackle, receives half the catch, the fishermen retaining the other half. "When the vessels have reached the fishing grounds," writes Dr. Fortin, "they are anchored by hemp or manilla cables in from fifteen to fifty fathoms of water. Bait is obtained by spreading nets in the sea at some distance from the vessel, and the fishing is then begun, with bultows or long lines, and carried on, by night as well as by day, in spite of wind and storm, until the hold of the vessel is filled up with fish all split and salted. Then the vessel returns to port, the cod is landed, washed, dried, and prepared for exportation."

Fishing in vessels is more expensive, but also more remunerative, than fishing with open boats along the shore. The cod taken on the Banks is larger and finer in quality than the fish taken along the coasts. An average of thirty Bank cods, when dried, makes a quintal, and it brings a higher price than the shore fish.

In the Province of Quebec and in Prince Edward Island, the cod fishery is still almost universally carried on in open boats, in the neighbourhood of the coves and bays where the fishermen reside. In some parts of the Province of Quebec, however, fishermen venture with their open boats to twenty and thirty miles from the shore. These boats are built by the fishermen themselves. They vary in dimensions from twenty to thirty feet keel, with a breadth of beam of from six to ten feet, according to the use they are intended for. They are very sheer built, and their clinker work is usually of cedar. Pointed at both ends, their rigging consists generally of two sprits or gaff-sails; some of those intended to fish on the Banks being schooner-rigged. They are comparatively light, in order to be easily hauled up on the beach in stormy weather; are good sailers, and behave wonderfully well at sea. Yet, although good sea boats and splendid sailers, manned by fishermen whose intrepidity and skilfulness are well known, these boats are too small to enable our fishermen to carry on cod-fishing upon as large a scale as it might be done. The fishermen of Quebec and Prince Edward Island, with their small boats,—being too often obliged to run before the storm, and leave the fishing grounds when they are sure of a good catch, in order to save themselves from being caught away from land by heavy gales,—lose every year much precious time, during which the

fishermen of Nova Scotia and New Brunswick reap an abundant harvest. The reports of the fisheries of the last few years show a noticeable diminution in the quantity of fish caught by the fishermen of the Province of Quebec, and this deficiency was due to no other cause than the frequent storms which raged in the Gulf of St. Lawrence during the last few years. The summer fishing has been a failure this year again, owing to the same cause, though there was fish in abundance.

Though the official Reports show an annual increase in the catch of codfish, we may safely say that, considering the increasing number of fishermen, the development of this fishery is stationary. And this condition, as remarked by Messrs. Hatton and Hervey, before referred to, is not caused by the falling off in quantity of the cod, but is largely due to the imperfect methods of taking them which still prevail. If we except a few enterprising men in the Maritime Provinces, the merchants, as a rule, are apathetic, and show no desire to procure information respecting what other countries are doing, or to induce their fishermen to use improved fishing gear. Science is not called in to aid this important industry in Canada, as it has been in the United States and in Europe. Above all, the vicious supply system, still more or less in force in the different Provinces, by which advances in food and clothing are made to the fisherman at the commencement of each season, is destructive to the industrious efforts of men who are thus rarely out of debt.

I certainly do not wish to insinuate that the condition of our fishermen is worse than that of fishermen elsewhere; for this "supply" system is necessary to the working of fishing industries in every part of the world. But if we had in Canada a well-organized Fishery Bureau, under the guidance of skilful scientists and practical men, and if the improvements of other countries were introduced here, our cod fishery, as well as our other fisheries, through the application of skill and capital, might be indefinitely increased. Capitalists, who should invest capital in this industry, would be always sure of a good market for their produce. The dried cod is regarded as an indispensable article of food by the inhabitants of warm countries. Every year we supply the Catholic countries of Europe and America with millions of dollars worth of dried codfish, our principal markets for dry codfish being Italy,

Spain, Portugal, Brazil, the British and Spanish West Indies, and United States.

The finest cod in all America is cured on the coast of Gaspé, in the Province of Quebec, where the effects of the mists generated by Gulf stream are least felt. It is well known in the markets of Spain, Italy and Brazil, where it is generally sent—the large fish going to the Mediterranean countries in bulk in vessels from one hundred to three hundred tons, and the small fish to Brazil in drums containing 128 pounds.

During the time that the fish is exposed on the "flakes" to dry, if the weather is fine, the sun shining, the westerly winds predominating, cod is easily cured and made of fine quality; but, sometimes, easterly winds prevailing, rain lasts for weeks, and in spite of all possible care and precaution, it is inevitably spoiled. So before sending it to the markets, the fish is carefully culled, the greater part of the best quality being sent to Europe and Brazil, and the inferior to the West Indies and United States markets. Nova Scotia, New Brunswick and Prince Edward Island export chiefly to the West Indies, United States and Brazil; Quebec to Brazil, the Mediterranean countries, and the West Indies.

According to the last statistics which we have on the matter, the West Indies have paid us for dried codfish \$2,000,000; Brazil and Europe, \$500,000 each; the United States, somewhat over that sum; and British Guiana, \$250,000.

VI. INDUSTRIES OF THE COD FISHERIES.

The cod is the most useful of all fish; no part of it is valueless. Oil is taken from its liver; the head, tongues, and sounds form a good article of food; the offal and bones, when steamed, dried, and ground, are converted into a very good manure, equal as a fertilizer, to the celebrated Peruvian guano. The roes are a splendid bait for the sardine fisheries of France and Spain; and from the swimming bladder isinglass is made.

Great Britain bought from us last year \$150,000 worth of cod oil, and cod tongues and sounds to \$125,000. The manufacturers of fish manure, in Nova Scotia, New Brunswick and British Columbia, have produced this commodity to the amount of \$80,000. I regret to state that the Province of Quebec has not yet a manufacture of guano. Thousands of tons of fish offal are, every year,

thrown away and wasted, which could be converted into fish manure worth from \$28 to \$40 a ton in the foreign markets. If manufactures of fish guano were built on the coasts of Labrador and Gaspesia, the manufacturer would realize handsome profits, and the fishermen, without much extra work, could dispose of products that are now wasted.

What I have just said about fish offal may also be said of the cod roes, which are not exported, although this article can be sold at a good profit. In France and Spain, where sardines and anchovy fisheries are carried on, at least 50,000 barrels of cod roes are wanted every year as bait for these fishes. In very good fishing years, Norway can supply the French and Spanish markets with about 35,000 barrels of roes. But this is the largest quantity which that country can give; and during 1881, 1882, and 1883, Norway could only sell 25,000 barrels. There would then remain an average of 20,000 barrels of cod roes of which could easily be furnished and sold by Canadian fishermen. When they cannot get the roes, the sardine fishermen are obliged to use costly chemical compositions as substitutes. Let us note here that a barrel of well-prepared cod roes is generally worth \$10 in the French markets. If we multiply twenty thousand barrels by ten, we have a sum of \$200,000 annually thrown into the sea by our fishermen because the trade has not been opened in Canada. A few years ago, French vessels traveled all along the Canadian fishing coast and bought all the cod roes they could get; but the want of experience of our fishermen in the salting of roes, and especially the absence of any law obliging this article to be inspected before being packed for exportation, caused a very inferior article to be furnished, and put an end to a trade which promised handsome profits.

Lastly, as to the industries connected with rope, cordage, line, nets, hooks, cooperage, etc., our country has up to the present moment bought, from Great Britain and the United States, all the fishing gear which our fishermen required. Now, manufactures of this kind are wanted in Canada, and would prosper well here. We have only to give them the million dollars that we spend in buying nets and other fishing gear. Let me add also this very important consideration: that the manufacture of fishing tackle on our coasts would give work to thousands of hands, and would prevent many of our countrymen from emigrating.

VII. THE HERRING FISHERY.

The sea fishing next in importance to the cod fishery in Canada is the herring fishery, the value of which, without taking into account the local consumption, and the quantity used as bait for the cod fishery, and for manure in many parts of the Dominion, was, according to our last statistics, represented by the sum of over \$2,135,000. This amount is a large one, and the result seems handsome, but it is certainly not in relation with the abundance of this fish in Canadian waters. The herring fishery is far from getting here all the attention it deserves; and I might even say that we have no *regular* herring fishery in Canada. It is true that in Nova Scotia, New Brunswick, and Prince Edward Island, schooners are especially fitted out for this fishery; that it is regularly and intelligently practised by a large number of men from those Provinces, bringing them handsome returns: still all these endeavours, although very laudable, are nothing but isolated undertakings.

It will perhaps surprise a good many of my readers, to learn that the whole of the Province of Quebec,—possessing 10,000 fishermen, 1,100 miles of maritime coasts, numerous bays, far-famed for the abundance of herring repairing to their waters,—does not annually export two thousand barrels of this fish. Although they could derive immense benefits from the working of the industry, the Quebec fishermen are satisfied when they have taken enough fish for their own consumption and for the wants of the cod fishery.

The reason of this apparent neglect lies in the fact that the Quebec merchants give all their time and attention to the cod fishery. And, nevertheless, it is almost impossible, without seeing it, to form a correct idea of the immense quantity of herrings that visit the coasts of the Province, especially in the spring during the spawning season. Their compact masses cover thousands of acres of the sea; so that, if the fishermen were provided with the necessary fishing appliances, if they had a ready market, they could easily, in a few days, even before the beginning of the cod fishery, catch enough herring to realize thousands of dollars. Out of the \$2,135,283 produced by our herring fishery in 1883, Nova Scotia New Brunswick and Prince Edward Island have \$1,750,000; Ontario, \$86,000; and British Columbia, \$14,000,—leaving to

Quebec a ridiculous proportion compared with the extent of its maritime coasts.

A regular fleet of vessels, from thirty to ninety tons, is used, in England, in the herring fisheries, which give employment to about 80,000 men, and in which English capitalists have invested enormous sums of money. The European fishermen, provided with good and improved fishing gear, and manning large and safe sea boats, go out fifty, sixty, and even one hundred miles if necessary, in search of shoals of herring. In Ireland, Scotland, England, France, Holland, etc., a herring-fishing craft costs, including the necessary fishing tackle, from \$5,000 to \$7,000. The returns of the herring fishery, properly made, must be very large in those countries, since they not only cover the immense disbursements necessary to carry it on, but bring in important profits. And yet the herring fisheries of Europe are not as rich or abundant as ours.

I assert with confidence that it, in Canada, this industry were carried on upon a scale proportionate to its importance and the abundance of herring in our waters; if companies were formed to provide our fishermen with boats and fishing implements like those used in Europe, our herring fishery, instead of two, would bring every year five or six millions of dollars. Nor are markets wanting for this fish, which is cheap, and can be bought by the poorest; for, besides our own market, we should have those of the United States, of England, Germany and the West Indies. The population of Europe and South America is growing rapidly, and the products of the fisheries of these countries are far from being abundant enough to meet the demand. We have there an almost unlimited market for our pickled fish, provided it be carefully prepared and packed.

As soon as the ice has disappeared from our coasts in the spring, herrings arrive in immense shoals, remaining in our waters till the month of December. A considerable quantity is even taken during the winter months, along the southern coast of New Brunswick and Nova Scotia. The spring herrings are not as valuable as those caught from the month of August to the month of December. The former are packed in barrels of two hundred pounds and sent to the West Indies; while the fat fish, caught in the latter end of the season, are carefully gutted and prepared for the United States and European markets,—our best being the celebrated Labrador

herring. For the last few years, small herrings have been successfully prepared in boxes like sardines, and this new trade is rapidly increasing. A breakfast delicacy, well known to epicures in America as well as in Europe, is the bright golden Digby Chicken,—a small smoked herring prepared in Nova Scotia. We exported last year 170,000 boxes of this much appreciated article of food.

Canada furnished, in the year 1882, the following quantities of herring to the foreign markets :—

Pickled, 423,042 barrels, - - - - -	\$1,739,943
Smoked, 1,060,416 boxes, - - - - -	311,807
Fresh, 16,050,000 pounds, - - - - -	83,533
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	\$2,135,283

All the fresh herring figuring in the above statement is sent from Nova Scotia and New Brunswick to the United States, and the largest quantity of the pickled and smoked herring is also exported from these two Provinces to the United States, West Indies and English markets; but, as I have said already, the amount of our exports of herring could be easily doubled.

VIII. THE MACKEREL FISHERY.

I am happy to say that our energetic and progressive neighbours to the south have no longer the almost exclusive monopoly of mackerel fishing in the Canadian waters,—a monopoly that they have enjoyed for a number of years. Wearied with beholding the success of the Gloucester fishermen, who, year after year, come to our own doors to reap an abundant crop, the fishermen of Nova Scotia and New Brunswick set to work, and have succeeded very well. They are to-day carrying on mackerel fishing on a large scale, and deriving good profits from it. They can show a fine fleet of vessels, so improved in symmetry as to bear fair comparison with the American schooners, which are reputed to be the finest vessels and the best sailers of their class in the world. Nor are they merely the owners of splendid vessels fitted out with the utmost care. They have adopted the most modern fishing appliances, and are prosecuting this industry with great tact and intelligence; for the mackerel fishery is difficult, precarious and uncertain. A schooner may cruise in the Gulf for a week without taking a single fish, while another gets filled in the space of a fortnight,

and sometimes less. It requires, therefore, to be carried on with sagacity and perseverance,—two qualities which distinguish the fishermen of our Maritime Provinces; but, then, it is generally successful, brings in large profits, and is certainly worthy of the attention of capitalists. It is to be hoped that many years will not elapse before Quebec, which up to this date has given little or no attention to this fishery, will also have her fleet of mackerel-fishing vessels.

The tourists who, during the dog days, run away from the heat of our cities to breathe the pure and vivifying air of the Gulf of St. Lawrence, and make the journey by water, have often in the course of their visits to the Maritime provinces, met with fine mackerel schooners and mistaken them for a small squadron of yachts, so beautiful are their masts and sails, so neat and clean are they kept. But, writes Dr. Fortin, “on a nearer approach, this is found to be an error; for on the decks of these vessels are to be seen crews of from ten to twenty men, all occupied either in catching fish, in repairing fishing implements, or in splitting and salting the fish that has been taken; and what is more striking is the order that reigns on board these schooners, whose decks and holds are almost always full of fish, fish barrels, salt, etc. These schooners are generally of from sixty to one hundred tons burden. They have little depth of hold, great breadth of beam, rake very much fore and aft, and carry large cotton sails which enable them to sail fast even with a light breeze. Their decks are roomy, and on them the whole work of salting and barreling is carried on.”

Hook and line, ordinary seines, and purse-seines are used in fishing mackerel in the Gulf. Gill-nets, smaller seines, and traps serve the same purpose in the bays, coves, creeks, and inlets along the coasts. Mackerel is met with off the coast of Nova Scotia, in the Bay of Fundy, in the Gulf of Canso; but nowhere is it more plentiful than in the Gulf of St. Lawrence, off the coast of Prince Edward Island, in the Bay of Chaleurs, and in the numerous coves and bays formed by the Magdalen Islands.

The mackerel is one of the most valuable fish visiting the Canadian coasts. A good proportion of our catch is sent fresh to the markets, some in tins, and the largest quantity pickled and packed in barrels. Our best market for either fresh, canned or pickled mackerel is the United States, although Great Britain and the

West Indies also buy some of it. From the last statistical returns, we see that the mackerel fishery produced \$1,250,000; but it could certainly afford employment to many additional vessels, and employ thousands of additional hands.

IX. THE LOBSTER AND OYSTER FISHERIES.

It seems to be the tendency in this age of competition to overdo any business which promises to be lucrative. "Not more than ten years ago," writes Mr. Hunter Duvar, in his Report to the Minister of Marine and Fisheries in 1879, "when the retail price of lobsters was two or three for a half-penny, a New Brunswicker came to Prince Edward Island and commenced the business of preserving in tins. Attracted by his success, a few other persons engaged in the same pursuit. The business gradually augmented until three or four years since, when it became endued with much more life, and has, at length, sprung into great dimensions." The following is a list of the number of cans put up for the market in Prince Edward Island:—

1871	-	-	-	-	-	-	-	-	-	-	6,711
1875	-	-	-	-	-	-	-	-	-	-	151,248
1876	-	-	-	-	-	-	-	-	-	-	362,676
1877	-	-	-	-	-	-	-	-	-	-	663,900
1878	-	-	-	-	-	-	-	-	-	-	1,649,800
1879	-	-	-	-	-	-	-	-	-	-	2,272,825
1880	-	-	-	-	-	-	-	-	-	-	3,551,000
1881	-	-	-	-	-	-	-	-	-	-	5,200,000
1882	-	-	-	-	-	-	-	-	-	-	6,300,000

This Province, which in 1871 had only one lobster-canning factory, had, ten years later, in 1881, one hundred and twenty of these establishments in full operation. The same development of the trade happened in New Brunswick and Nova Scotia. In 1870, New Brunswick had only one factory, the owner of which prepared 20,000 cans of fish. Ten years after, 6,000,000 cans were sent from this Province to different foreign markets. Nova Scotia, producing only 30,000 cans in 1870, exported 5,000,000 in 1882. Quebec, far behind her sister Provinces in the prosecution of this industry, did not produce more than 800,000 cans last year.

If we recapitulate the above figures, we shall find that the lobster fishery, which was almost unknown in Canada ten years ago, is

carried on to-day in more than 600 factories, which, last year, sent to the different markets of the world 17,500,000 cans, representing a value of \$3,000,000, almost equivalent to the value of our herring and mackerel fisheries put together. These seventeen millions and a half of cans represent, at three lobsters to each can, 52,500,000 lobsters taken in the Canadian waters in 1882. The number of lobsters taken in all England does not exceed 3,000,000 each year.

This comparatively enormous development in the catch of lobster, in indicating the extent and richness of our lobster fishery, suggests also the danger of over-production, both of which facts point to the necessity of economizing and perpetuating the general supplies. "There is nothing easier," says Mr. W. F. Whitcher, who for many years has presided over our Fishery Department, "than to exhaust a shell fishery, but also nothing harder than to revive it; and the Government of the Dominion, alive to this fact, has taken measures to prevent any indiscriminate fishing of the lobster on our coasts. Doubtless, if the fishing that is now carried on was not subjected to regulations, all persons interested in it would prosper for a short time, and the country would appear to benefit by the rapid and extensive development of this resource, but a period of reaction would necessarily ensue."

I need hardly mention here that this industry is of considerable importance in the general economy of the Dominion. Every one understands that the erection of buildings, tin and iron work, boat building, fuel cutting, truckage, etc., cause a large amount of money to circulate amongst our fishing population, and fair wages to be paid to thousands of hands, men, women and children.

Great Britain is our best market for preserved lobsters. We also export annually some 3,000,000 cans to the United States. France takes about 200,000 cans, and the remainder is divided between the West Indies, Germany, Brazil, and some other markets of South America.

A word about the Oyster fishery naturally finds its place here. This mollusc, so well known by epicures of all countries, is still comparatively abundant in Canada. In Europe, owing to its scarcity, it sells at a fabulous price, and wealthy people alone can indulge in this luxury, but on our coasts almost everybody can, from time to time, enjoy a good oyster soup.

We have the Malpeque, the St. Simon, the Caraquet, and many other varieties, deriving their names from the localities where the banks from which they are taken are situated. Oyster fishing is carried on chiefly on the coasts of Prince Edward Island and New Brunswick, and yields annually a round sum of \$200,000.

X. THE SEAL FISHERY.

The herds of seals that frequent the Gulf of St. Lawrence and the Atlantic Ocean arrive there in the month of November. They come into the Gulf through the Strait of Belleisle. They keep close to the coast of Labrador and Newfoundland, penetrating into all the bays, and not going far out from land when doubling the points and capes. They are fond of approaching the shore, and landing on sandy beaches or flat rocks to bask in the sun; but at the slightest noise, and, especially if they perceive the fishermen, they make for the sea and disappear under its waters.

Seals are of great value, not only on account of the thick layer of fat between their skin and muscles, which yields an oil superior to that of the whale, but also on account of their skin, which tans well and makes an excellent leather. Their importance, from a commercial point of view, was soon perceived by the first mariners who visited the Gulf of St. Lawrence, for, no sooner was Canada discovered, than the seal fishery was prosecuted on our coasts, and, if we are to believe the accounts which have come down to us of several voyages to the coasts of Labrador during the last century, immense numbers of them were taken at that period.

Then, as now, nets were used for the purpose of capturing these marine animals. These nets are made of a hempen cord, which is very strong, although not more than the twelfth part of an inch thick. The meshes are eight inches square and will admit the head and neck of the seal. Some of these nets are more than six hundred feet long by sixty feet wide. The usual time for the seals to pass near the shore on their migratory voyage being known, the nets are set a few days before. One of the fishermen is posted as a sentry on a rock a little in advance of the fishery, to give notice of the approach of the herds of seal, and the moment that any appear in the fishery, the signal is given, and

the fishermen hasten to raise, by means of a capstan, a net sunk by weights to the bottom of the water at the entrance of the fishery. With this net they close the opening through which the seals made their ingress; and as soon as this operation is completed, and the seals are fairly imprisoned, the fishermen jump into their boats and enter the fishery shouting and beating the water with their paddles. The frightened seals, trying to escape, dive down and run their heads into the meshes of the nets, which are kept open by means of cables round their borders. As soon as the seals are caught in the meshes, the men under-run the nets, knock on the head those that are not strangled and carry them all on shore in their canoes.

The autumn seal fishery takes place at the end of November and in December on the coast of Labrador, and is very arduous, owing to the severity of the cold at that season. The seals are no sooner taken out of the water, than they become frozen; and in that state they are put into stores, and it is not until the spring, when the weather has softened them, that they are cut up and their fat melted.

But it is not only near the shore in nets, after the manner I have just described, that the seals are taken; they are also pursued in every direction, and are sought for on the ice-fields, not only in the Gulf of St. Lawrence, but even in the North Atlantic Ocean. Strong sailing vessels and steamers, specially fitted out for this latter kind of fishing, or rather hunting, start early in the month of March, in order to find the seals on the ice-fields; for, when once they get into the water, they can set the most experienced men at defiance, and it is useless to pursue them.

The inhabitants of Labrador and the Magdalen Islands are the only fishermen in Canada who bestow any attention upon the seal fishery, which certainly would yield large profits to all who should invest in it. Newfoundland carries on the seal fishery on a large scale. Ten thousand of her fishermen are employed in it. The Newfoundland capitalists, whose spirit of initiative and of enterprise is well known, have replaced the sailing vessels formerly in use by a splendid fleet of steamers, which have the advantage over sailing vessels of making and completing two trips instead of one.

Notwithstanding the heavy expenses which must necessarily be

incurred in carrying on this fishery, its returns pay so well, that experienced and competent business men assure us that capital invested in it will generally bring twenty-five and sometimes forty per cent. Every spring we see in the newspapers that the Newfoundland steamers are back from the ice-fields, some with from 10,000 to 20,000 seals, others with from 20,000 to 40,000 each. And each seal, oil and skin, is worth on an average \$3. In 1883, Newfoundland exported seal skins and seal oil to the amount of \$1,080,000, while Canada did not go much beyond \$200,000. And yet this industry could produce as much in Canada as in Newfoundland, if our business men would give their attention to it.

XI. FRESH-WATER FISHERIES : SALMON.

Although not quite as important as our deep-sea fisheries, from a commercial point of view, the fresh-water fisheries of Canada are nevertheless most valuable. Without taking into account the \$3,000,000 which they furnish annually to our export trade, they are the chief source from which those, who live on the shores of our large lakes and by our principal rivers, get their daily food and supply our markets of the interior.

Salmon is considered the best, and is called the king of fresh-water fishes. Abundant enough still in the rivers of the Dominion, you meet him alike in the cottage of the poor, and in the mansion of the rich. Our rivers, which were formerly renowned for the large quantity of salmon found in them, are not now so well stocked with this fish, owing to an indiscriminate fishing at all seasons of the year, and to the want of proper laws for its preservation.

Many persons will perhaps be tempted to ask how it is that within the last ten years, in spite of the judicious regulations limiting the salmon-fishing to certain seasons of the year, and prescribing the size, kind, and number of fishing implements that may be used; in spite of the Government's endeavors to replenish our rivers, and though we are spending thousands of dollars, every year, to help the natural propagation by artificial breeding; in presence of the fact that, from twelve or thirteen fish-breeding establishments under the control of the Government, millions of young fish are yearly distributed in many of our rivers,—yet there is no marked increase in the annual catch, but rather a tendency to

a gradual decrease. My own opinion is that more protection should be given. More and better-paid guardians should be appointed, and we should try to stop the destructive work of the numerous marauders who, every fall, enter our best rivers, and kill thousands of salmon on their spawning beds. I am of opinion too, that the present fly-fishing season is too long. Though I have heard the Superintendent of our fish-breeding establishments say that fly-fishing was in reality helping the propagation of the salmon; and although I have the greatest respect for the scientific and practical knowledge of this gentleman, I firmly believe that if the angler was obliged to put up his lines on the same day that the salmon fisherman is forced by law to raise his nets and leave a free passage to this fish, great benefits would be derived from such regulations.

Those who live by salmon-fishing, and who furnish to our export trade millions of dollars worth of this fish, are obliged by law to take away their nets at a given time,—at the end of July in the Province of Quebec, and later in New Brunswick and Nova Scotia,—while the angler, who has no other object in view than sport and pastime, is allowed to fish till September 1st, and even till October 15th. This certainly appears to be an anomaly. The salmon, which have succeeded in avoiding the nets at or near the mouths of the rivers, and go up them to reproduce their species, fall a victim to the skill of the angler. Hundreds of salmon, which would have reproduced thousands of others, are destroyed every year in this manner. I have heard many experienced gentlemen express the opinion that, if greater protection were given to the salmon fishery, we should not be obliged to make extreme and costly endeavors to arrest its decline,—endeavors, the practical results of which are yet far from being well ascertained.

I should not like, however, to convey the idea, that our salmon fishery is exhausted. Far from it. It has somewhat decreased in abundance, compared with what it was twenty or thirty years ago, but it has still considerable importance, as will be shown by statistics, and is a source of wealth to many of the inhabitants of the Dominion, besides affording splendid sport to a number of wealthy gentlemen from Europe and America, who visit our rivers every summer to enjoy the pleasure of salmon fly-fishing. In 1882, Canada supplied the foreign market with \$3,000,000 worth of fish, either fresh, canned or pickled. The United States take most of

our fresh salmon, and Great Britain the largest proportion of the fish preserved in tins. Pickled salmon goes mostly to the United States. Attempts have already been successfully made to send fresh salmon from Canada to England, and I have no doubt a greater quantity of it will now be sent over every year. And, before many years have elapsed, when means of transit will exist between our cities of the interior and the fishing coasts, the fresh salmon trade will attain proportions hitherto unknown.

British Columbia, of all the Provinces of the Dominion, is the most celebrated for its salmon fishery, and, within a few years, this industry has attained almost colossal proportions. The catch which, in 1879, was only 3,000,000 lbs., had in 1882 risen to 12,000,000 lbs., showing an increase of nine millions in three years. "And yet," says Mr. Anderson, Inspector of Fisheries for British Columbia, "the canneries of this Province, notwithstanding the abundance of fish, could not be worked up to their full capacity, owing to the deficiency of labour arising from the increased demand for railways and other purposes." I find in the last statistics which we have on this subject, that 15,220,000 lbs. of salmon were taken out of Canadian waters in 1882. Calculating every fish taken at an average weight of fifteen pounds, this will give us 1,014,600 salmon caught that year, and the statistics for 1883 will certainly show an increase on the above figures.

Let us hope that the British Columbia fishermen will be wise enough to economize, by a judicious fishing, the source of wealth they have in their salmon, rather than be obliged, later on, to try to restore it from exhaustion. The idea is suggested by the fact that the question of establishing a salmon hatchery on the waters of the Fraser River, one of the best salmon rivers of the Province, is already agitated. The capital invested in the salmon fishery of Columbia River in 1882, as given by the trade report, is estimated at over \$2,000,000, and employment was given to more than 7,000 men; while Mr. A. C. Anderson writes that, "in addition to the quantity of salmon canned for exportation during the past year in British Columbia, a little over 5,000 barrels of salted salmon have also been packed in pickle. The demand for the fish so cured appears to be rapidly increasing; and there can be little question that, with due care in the preparation, the barreled salmon of this coast will soon attain a world-wide reputation. In this branch of

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industry less capital is required than in the prosecution of the canning business, and a broad field is thus opened for the industrious fishermen of moderate means. * * * Everything indicates the expansion of the British Columbia fishing interest, the great value of which is gradually being recognized. The rapid advance of the Canadian Pacific Railway warrants the assumption that, ere long, direct communications with the Eastern Provinces will be available, and it is easy to conceive, at least partially, the impetus which this much-desired communication will give to all the industries of the Pacific coasts." (Report of 1882.)

XII. TROUT, WHITE-FISH, ETC.

Trout of all kinds abound in every Canadian river, and the best are the sea trout and the salmon trout. White-fish and trout fisheries are carried on on a large scale, chiefly on the lakes of Ontario. The area covered by Lake Superior alone is thirty-one thousand square miles, and Lakes Erie, Huron and Ontario form, when put together, an expanse of fifty-two thousand square miles. Many rivers empty their waters into these inland seas, and these rivers, as well as the lakes themselves, are full of different kinds of food fishes, the delicacy and flavor of which are well known. The Ontario fisherman has the salmon trout, weighing as much as eighty pounds, and the white-fish, the flavor of which is considered equal to that of the salmon. The sturgeon, the pickerel, the pike, the bass, the perch, etc., form other varieties of fishes found in Ontario.

The fishermen of our Canadian Lakes use gill-nets and trap-nets, and their vessels are either sailing boats of from twenty to thirty feet in length, or small steamers called "fishing tugs." Two models of these small steamers were much admired last year at the London Fisheries Exhibition. Those fishing tugs are generally fifty feet long and have twelve feet beam. They are the property of fish merchants, who hire men to fish for them on wages, without any share in the profits of the industry. Sometimes they will receive a bonus from the proprietor in cases of successful catches. The great advantage of those tugs over the sailing boats is easily seen. While some of the men on board are busy taking in the nets set the day previous, the others are engaged in setting out clean nets. These two operations finished, the tug hastens to the

nearest railway station, and the fish just caught is immediately sent by the cars, in refrigerators, to the Canadian and American cities. Besides, on calm days, or when the wind is blowing too hard to permit the sailing boats to go out, the steamers can always reach the fishing grounds. The amount of white-fish, trout, etc., taken from the lakes and sent fresh to the market in 1882, amounted to 4,500,000 lbs. But, besides this, there were salted, of white fish, 5,079 barrels; of trout, 9,758 barrels; of sturgeon, bass, pike, maskinonge and other kinds, 41,360 barrels; Total, 56,197 barrels. If this sum be multiplied by 200, the number of pounds in each barrel, we get a product of 11,239,400 lbs., which added to the four millions and a half already mentioned, will give the large amount of 15,739,400 lbs. for one year. As farmers chiefly compose the population of Ontario, and as, comparatively speaking, very little capital is invested in lake fisheries, we are safe in asserting that the amount of fish now caught could be doubled or even trebled, if a larger number of men were employed in the development of this industry. Besides this produce of the fresh-water fisheries in the Province of Ontario, we have other fisheries in the Maritime Provinces, such as the Smelt fisheries which, during the winter months, employ many hundred men and produce annually \$200,000. The annual yield of the Alewife fishery is \$185,000; of the Shad fishery, \$105,000; of the Eel fishery, \$80,000; of the Winnonish fishery, \$15,000; of the Sardine fishery, \$175,000, besides others. I may add, however, that the fresh-water fishes of the Dominion, though sold generally at a low figure, produced according to our last statistics, the sum of \$4,000,000.

The ease with which fish is attainable all through Canada has proved a special inducement to the poor of other countries to emigrate to our shores. They may be sure, to begin with, of having, at no expense except the trouble of fishing for it, a substantial and wholesome article of diet. This, with the possession of a farm sold by Government at a merely nominal price, with sobriety and economy, is sure to lead them within a few years to comfort and prosperity.

CONCLUSION.

I cannot better end this essay than by quoting some remarks by P. L. Simmons in his "Commercial Products of the Sea:" "The commercial products obtained from the sea," he writes, "are more

numerous and important than would be generally supposed by those who have not looked closely into the matter. To a great part of the civilized world the taking of the cod, the herring, the salmon, the mackerel, the sardine, the seal and the other fishes, is of great value, and gives employment to hundreds of thousands of persons. The oil obtained from the seal, cod, shark, etc., is used for lamps, medicine, and in industry. Many parts of fish are employed in the arts and manufactures,—as the scales of the bleak for making false pearls, and those of other fish for making ornaments; the skins of the seals and the porpoises for tanning purposes. Isinglass is obtained from the air or swimming bladders of many. Fish roes are not only used as fish delicacies, but also for bait in some fishing grounds, and excellent guano is made from the offal and the bones of fish. *The sea is more abundantly stocked with living creatures than the land.* In all parts of the world a rocky and partially protected shore, perhaps supports, in a given space, a greater number of individual animals than any other station. The sea is filled with animals of several kinds, and each layer of water in depth, seems to have its own varieties, thus resembling the changes which take place, according to elevation, in the organized portions of the land. The animals are among the mightiest and among the smallest. There are swimming beasts, as whales, seals and walruses. There are fishes of various kinds and sizes, crustaceous, soft or jelly fishes, the molluscs, down to those creatures resembling live plants. All these are peculiar to the sea or the fresh waters; and the ocean has its marine plants,—sea weeds, which remain growing on the ground shoal or rise to the surface and then float. These, too, have many useful or economical applications."

The harvest of the sea has not yet been attended to and garnered to the same extent as that of the land. Some nations, such as the Chinese, have, it is true, long given close attention to the profitable utilization of its commercial products; and several European nations and the Americans have also prosecuted certain fisheries, but systematic and scientific arrangement has only of late years been specially directed to the various branches which have been termed pisciculture, acquiculture and ostreiculture, and the transfer of the fishes of one locality to another district. By all civilized and commercial nations, especially the Dutch, the English, the Norwegian,

the French, and the American, the products of the sea have been accounted fully as important as those of the land.

The fishery question is therefore of urgent consequence to the people generally, and any information ought to be welcome which increases our knowledge of the fishing grounds within our reach ; for the fisheries are not only of importance to us in consequence of the vast amount of wealth that can be drawn from the deep, apparently without diminishing or exhausting its source, but because, by this means a body of able and hardy seamen may be found to conduct the commerce of a maritime country during peace, and to become its gallant defenders on the ocean in time of war. I sincerely hope, that both our public men and our capitalists will give their attention to this very important question, and will do their utmost to develop further this inexhaustible source of national wealth and greatness.

