1912-1913

DOMINION

SHELL-FISH FISHERY COMMISSION

REPORT AND RECOMMENDATIONS

COMMISSIONERS:

PROFESSOR E. E. PRINCE, LL.D., D.Sc.. F.R.S.C., Ottawa, Chairman.
R. O'LEARY, Esq., Richibucto, New Brunswick.
HON. JOHN McLEAN, Souris, Prince Edward Island.
S. Y. WILSON, Esq., Halifax, Nova Scotia.

OTTAWA
GOVERNMENT PRINTING BUREAU
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PREFATORY NOTE BY PROFESSOR E. E. PRINCE, LL.D., D.Sc., F.R.S.C., &c., DOMINION COMMISSIONER OF FISHERIES AND CHAIRMAN OF THE SHELL-FISH FISHERY COMMISSION, 1912-1913.

A brief word of explanation appears desirable in respect to the Report and Recommendations of the members of the Shell-fish Fishery Commission.

The subjects embraced in the commission's investigations are amongst the most important and complicated connected with the fisheries of the Dominion, and the agreement and perfect unanimity of four commissioners in the conclusions reached at the end of their labours is an evidence of the thoroughness and unbiassed manner in which the inquiry was carried on. No commissioners could have been better qualified for the work, or more completely familiar with all phases of the great shell-fish industries of the Atlantic coast of Canada.

The commission were instructed to overtake the work and complete their report in a few months, and though the original period specified, about five months, proved too short, and it had to be extended, the present report was ready after a few protracted and laborious executive sittings. It evidences a devotion to the public interest ,and an earnestness in the rapid execution of the work, which, in my experience of fishery commissions has rarely been approached. Nor must it be forgotten that fifty public sittings were held, involving long journeys through the three provinces of Nova Scotia, New Brunswick and Prince Edward Island, and the hearing of evidence from no fewer than 284 witnesses.

It scarcely admits of doubt that the conclusions reached by a commission so devoted and so thoroughly posted as practical men engaged in these shell-fish industries must be of special value and their adoption should inure to the permanent welfare of the great shell-fish fisheries of the Maritime provinces.

As chairman I wish to bear warm testimony to the work of each commissioner individually, and to the cordiality and unanimity of the commissioners in their combined labours.

OTTAWA, June 1, 1913.

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ALLEN, W. K., Port Elgin, N.B.
ALLEN, JOHN T., Port Elgin, N.B.
ALLEN, KIRBY, Port Elgin, N.B.
AMIRO, LEANDER C., West Pubnico, N.S.
ANDERSON, Capt. W., Annapolis, N.S.
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ARMSTRONG, Mayor R. E., St. Andrews, N.B.
ARSENAULT, JOHN, Summerside, P.E.I.
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ARSENAULT, P. M., Egmont Bay, P.E.I.
BAKER, ABNER, Liscomb, N.S.
BAKER, SYDNEY N., Liscomb, N.S.
BAXTER, J., Digby, .S.
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BARRON, M. A., Charlottetown, P.E.I.
BASTARCH, SIMON, Cocagne, N.B.
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CALDER, JOHN F., Inspector, St. Andrews, N.B.
CAMERON, Wm., Louisburg, C.B.
CARBONNELL, E. T., Charlottetown, P.E.I.
CARSCADDEN, JOHN, Mace's Bay, N.B.
CHAFFEY, JOS., Souris, P.E.I.
CHAPMAN, R. A., Inspector of Fisheries, Moncton, N.B.
CHURCHILL, CHAS. E., Short Beach, N.S.
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COLLETT, CYRIL, Buctouche, N.B.
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COOK, Fishery Officer, Grosvenor, Seal Cove, G.M.
CORMIER, FERDINAND, Shediac, N.B.
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FISHER, THOS., Georgetown, P.E.I.
FOUGERE, WM., Shediac, N.B.
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GIDNEY, E. A., Digby, N.S.
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GILLIS, ALLAN, Souris, P.E.I.,
GOODWIN, CAPT., S.S.
GOODY, CLOVIE, Egmont Bay, P.E.I.
GRANT, Capt., Louisburg, C.B.
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GREEN, PERCY, Seal Cove.
HARRIS, AUGUSTUS, Digby, N.S.
HARTLING, FRED., Liscombe, N.S.
HARDING, HEBRON, Little Harbour, N.S.
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HATFIELD, PAUL, Boston, U.S.
HEBB, Overseer, Chester, N.S.
HILTZ, E. R., Kingsport, N.S.
HEALEY, P. J., Boston, U.S.A.
HIGGINS, R. R., Boston, U.S.A.
HEMEON, JOHN, Little Harbour, N.S.
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HOLLAND, ANGUS, St. George, N.B.
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MCCORMICK, J. A., Souris, P.E.I.
MCDONALD, RONALD, Bay du Vin, N.B.
MCDONALD, TEMPLETON, Georgetown, P.E.I.
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MCFARLANE, JAS. E., Orangedale, C.B.
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MCKEOGH, Rev., Canso, N.S.
MCLAUGHLIN, H. F., Seal Cove, G.M.
MCLEAN, WM., Bathurst, N.B.
MCLEOD, ALLAN, Murray Harbour, P.E.I.
MCLEOD, WM., Alberton, P.E.I.
MCLEOD, SAMUEL, Murray Harbour, P.E.I.
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MCPHEE, JOHN, Georgetown, P.E.I.
MCQUINLAN, JOHN, Charlottetown, P.E.I.
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NEVILLE, J. A., Halifax N.S.
NICKERSON, M. H., Clark's Harbour, N.S.
OGDEN, ALFRED, Halifax, N.S.
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OLIVER, SYD., Annapolis, N.S.
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PAULIN, J. A., Caraquet, N.B.
PATTERSON, J., St. John, N.B.
PENNY, R. W., Murray Harbour, P.E.I.
PERLE, DENNIS, Big Tancook Island.
PERLE, WARREN, Big Tancook Island.
PERRY, LOUIS R., Mt. Carmel, P.E.I.
PETIPAS, EDWARD, Shediac, N.B.
PINAUD, SIMON, Charlottetown, P.E.I.
POOLE, C. A., Georgetown, P.E.I.
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POIRIER, THADEE F., Summersied, P.E.I.
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ROCHE, WM., Lockeport, N.S.
REID, JOHN A., Port Elgin, N.B.
RICHARD, PETER, Summerside, P.E.I.
ROSS, ELIJAH, Yarmouth, N.S.
ROWLINGS, GEO., Halifax, N.S.

RUSSELL, CLEVELAND, Seal Cove, G.M.
RUDOLPH, J. F., Liscomb, N.S.
SAVOY, JAMES C., Chatham, N.B.
SCHRIEDER, WM., Canso, N.S.
SCOTT, PERCY, Bay du Vin, N.B.
SHARP, SHELDON, Summerside, P.E.I.
SHARP, J. LITTLE, Summerside, P.E.I.
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SIMS, FREEMAN, Digby, N.S.
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SMALL, LEWIS, North Head, G.M.
SMITH, FRANK, Buctouche, N.B.
SMITH, W., St. John, N.B.
SMITH, F., Halifax, N.S.
SMITH, T. F., Halifax, N.S.
SMITH, MOSES G., Clark's Harbour, N.S.
SMITH, BYRON, Clark's Harbour, N.S.
SMITH, THOMAS, Yarmouth Bar, N.S.
SPROULE, DAVID, Digby, N.S.
SPEARS, NELSON, Liscomb, N.S.
SPINNEY, E. K., Yarmouth, N.S.
STAYNER, A. C., Wallace, N.S.
STANLEY, JOS., St. John, N.B.
STANFORD, ARTHUR, Big Tancook, N.S.
STERNS, CHAS. H., Souris, P.E.I.
STEWART, E. L., Souris, P.E.I.
STEWART, MILLET, Chatham, N.B.
SWIM, C. H., Little Harbour, N.S.
STEPHENS, Capt. ITHIMAR, Lockeport, N.S.
SWIM, Capt. PETER, Clark's Harbour, N.S.
TARR, ED., Western Head, Queens Co., N.S.
TAYLOR, THOS., Georgetown, P.E.I.
TANNER, ALF., Louisburg, C.B.
TANNER, WESLEY, Louisburg, C.B.
THYMOT, Capt. MOSES, Digby, N.S.
TINER, DAVID, St. John, N.B.
TIDMARSH, W. F., Charlottetown, P.E.I.
TOWNSEND, ELIAS, Louisburg, N.S.
TRASK, W. S., Digby, N.S.
TURGEON, O., M.P., Bathurst, N.B.
TURNER, J. A., St. John, N.B.
VENIOT, P. J., Bathurst, N.B.
WALL, H., Halifax, N.S.
WEEN, DAVID, Mace's Bay, N.B.
WEEN, GEO., Mace's Bay, N.B.
WELLS, Capt. J. G., Canso, N.S.
WEIR, SPURGEON, Mink Cove, Digby, N.S
WEST, WM., Kingsport, N.S.
WHITMAN, CLEM, Canso, N.S.
WHITMAN, E. C., Louisburg, C.B.
WHITE, FRANK H., Souris, P.E.I.
WHITMAN, GEORGE, Digby N.S.
WILLIAMS, DOANE, Lockport, N.S.

WILLISTON, HOWARD, Bay du Vin, N.B.
WILLISTON, HAROLD, Bay du Vin, N.B.
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WILLISTON, WATHEN, Bay du Vin, N.B.
WILSON, ALLAN, Seal Cove.
WILCOCKS, EUGENE, Seal Cove.
WILNOTT, JOS., Big Tancook, N.S.
WINDSOR, Capt. JOSEPH, Kingsport, N.S.
WORRELL, Fishery Officer, St. Andrews, N.B.
WILLIAMS, R., Halifax, N.S.
WOODS, HARRY, Belmont, P.E.I.
WYMAN, ARTHUR, Short Beach, N.S.
YORSTOUN, W. H., Georgetown, P.E.I.

OFFICE OF THE COMMISSIONER OF FISHERIES,

OTTAWA, May 24, 1913.

The Honourable J. D. HAZEN,
Minister of Marine and Fisheries.

SIR,—In compliance with the terms of the Order in Council signed by His Royal Highness the Governor General on July 4, 1912, appointing us commissioners to conduct an investigation into the shell-fish industries of the maritime provinces, we have carried on and have completed our investigations in the provinces of Nova Scotia, New Brunswick and Prince Edward Island, and have taken evidence from witnesses who appeared before us at fifty (50) public sittings held at important centres in the said provinces, and have also received information orally and in writing, by means of petitions and documents laid before us, and have personally visited most of the fishing localities, the principal shipping points for lobster and shell-fish on the Atlantic coast, finally visiting Boston where large shipments of Canadian lobsters are received, and Rhode Island where lobster rearing is being carried on; and have thus taken all the steps requisite to a full inquiry into the matters which we were appointed to examine and to report upon.

The following is a copy of the Commission issued with the Sign Manual of His Royal Highness the Governor General, and in this Commission we had full authority to complete a thorough inquiry into the various phases of the industries specified:—

COMMISSION.

(Signed)
ARTHUR
(Governor General of Canada).

CANADA.

GEORGE THE FIFTH, *by the Grace of God, of the United Kingdom of Great Britain and Ireland and of the British Dominions beyond the Seas,* KING, *Defender of the Faith, Emperor of India.*

To all to whom these presents shall come or whom the same may in anywise concern,

GREETING:

WHEREAS in and by an Order of His Royal Highness Our Governor General in Council, bearing date the fourth day of July, in the year of Our Lord one thousand nine hundred and twelve (a copy of which is hereto annexed), provision has been made for an investigation and report by Our Commissioners therein and hereinafter named upon the shell-fish industries of the Provinces of Nova Scotia, New Brunswick and Prince Edward Island, including the lobster, oyster, and clam fisheries.

NOW KNOW YE that by and with the advice of Our Privy Council for Canada, We do by these presents nominate, constitute and appoint RICHARD O'LEARY, of Richibucto, in the Province of New Brunswick, Esquire, the Hon. JOHN MACLEAN, of Souris, in the Province of Prince Edward Island, a member of the Legislative Assembly of the said Province of Prince Edward Island, S. Y. WILSON, of the City of Halifax, in the Province of Nova Scotia, Esquire, and EDWARD ERNEST PRINCE, of the City of Ottawa, in the Province of Ontario, Esquire, Commissioner of Fisheries and International Commissioner, to be Our Commissioners to conduct such inquiry; to have, hold, exercise and enjoy the said office, place and trust unto the said RICHARD O'LEARY,

JOHN MACLEAN, S. Y. WILSON and EDWARD ERNEST PRINCE, together with the rights, powers, privileges and emoluments unto the said office, place and trust of right and by law appertaining during pleasure. And We do further nominate, constitute and appoint the said EDWARD ERNEST PRINCE to be Chairman of such Commission. And We do hereby under the authority of the Revised Statute respecting Inquiries concerning Public Matters, confer upon Our said Commissioners the power of summoning before them any witnesses and of requiring them to give evidence on oath, or on solemn affirmation, if they are persons entitled to affirm in civil matters, and orally or in writing, and to produce such documents and things as Our said Commissioners shall deem requisite to the full investigation of the matters into which they are hereby appointed to examine. And We do hereby require and direct Our said Commissioners to report to His Royal Highness Our Governor General in Council the result of their investigation, together with the evidence taken before them and any opinion they may see fit to express thereon.

IN TESTIMONY WHEREOF We have caused these Our Letters to be made patent and the Great Seal of Canada to be hereunto affixed:—WITNESS: Our Most Dear and Entirely Beloved Uncle and Most Faithful Counsellor, Field-Marshall, His Royal Highness Prince Arthur William Patrick Albert, Duke of Connaught and of Strathearn; Earl of Sussex (in the Peerage of the United Kingdom); Prince of the United Kingdom of Great Britain and Ireland, Duke of Saxony, Prince of Saxe-Coburg and Gotha; Knight of Our Most Noble Order of the Garter; Knight of Our Most Ancient and Most Noble Order of the Thistle; Knight of Our Most Illustrious Order of Saint Patrick; One of Our Most Honourable Privy Council; Great Master of Our Most Honourable Order of the Bath; Knight Grand Commander of Our Most Exalted Order of the Star of India; Knight Grand Cross of Our Most Distinguished Order of Saint Michael and Saint George; Knight Grand Commander of Our Most Eminent Order of the Indian Empire; Knight Grand Cross of Our Royal Victorian Order; Our Personal Aide-de-Camp; Governor General and Commander-in-Chief of Our Dominion of Canada.

At Our Government House, in Our City of Ottawa, this fourth day of July, in the year of Our Lord one thousand nine hundred and twelve and in the third year of Our Reign.

By Command.

P. PELLETIER,
Acting Under-Secretary of State.

FRANCIS H. GISBORNE,
Assistant Deputy Minister of Justice,
Canada.

During our extended tour, lasting over two and one-half months, we heard at the sittings of the commission 284 witnesses, and we travelled by rail, steamer and road over 2,700 miles.

In the course of our work we were indebted to members of parliament, city councils, boards of trade, and other public bodies, and to a large number of private citizens interested in the commission's work, for various courtesies, which considerably aided the progress of our investigations. The different inspectors and officers in the districts we visited, with a few notable exceptions, did all they could to assist our work; and the fishery cruisers, under instructions from the Deputy Minister of the Naval Service, enabled us to carry out our long programme of sittings, which without this aid would have been impossible as many of the places visited were on somewhat remote parts of the coast not easily reached except by steamer. We feel it necessary to add that on our visit to the lobster-rearing establishment at Wickford,

R.I., we received much attention and kindness from Commissioner Charles W. Willard and Superintendent E. W. Barnes; while from the State Fish and Game Commission of Massachusetts through its head, Dr. G. W. Field, we were given invaluable assistance and information and much personal attention, which we wish to cordially acknowledge.

The following is a list of our public sittings:—

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"	X	Council Chamber, Summerside, P.E.I.	" 13
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"	XL	Court House, Liverpool, N.S.	" 22
"	XLI	Public Hall, Clark's Harbour, N.S.	" 23
"	XLII	Court House, Yarmouth, N.S.	" 24
"	XLIII	Council Chambers, Digby, N.S.	" 25
"	XLIV	Public Hall, Liscomb, N.S.	November 8
"	XLV	" Little Harbour, N.S.	" 11
"	XLVI	" Lockeport, N.S.	" 12
"	XLVII	Boston, Mass.	" 16
"	XLVIII	Court House, Annapolis Royal, N.S.	" 18
"	XLIX	Public Hall, Kingsport, N.S.	" 19
"	L	Court House, Summerside, P.E.I.	" 20

At the close of our tour of investigation and series of public sittings, we met in executive session in Ottawa in January and in April, and had the advantage of lengthy conferences with members of parliament and important men engaged in the shell-fish industry, and thus added to the information necessary for the framing of our report and recommendations.

PREVIOUS SHELL-FISH COMMISSIONS.

In 1887, exactly twenty-five years ago, a Dominion commission carried out investigations into the whole of the shell-fish fisheries of Canada, and the report presented by the four commissioners, though not wholly unanimous, is still a document of much interest and value.

In 1889, Lieut. A. R. Gordon, R.N., fully investigated the lobster fisheries, and gave in to the Minister of Marine and Fisheries a most valuable report, in which various aspects of the industry as presented at that time were fully reported on.

In 1894, the Dominion Commissioner of Fisheries (chairman of the present commission) was instructed by Sir Charles Hibbert Tupper to hold a thorough inquiry into the lobster fisheries, and he held conferences with the leading lobster packers and fishermen in Charlottetown, Summerside, Moncton, Halifax, and other centres of the industry.

But it was the Lobster Commission of 1898 which most thoroughly completed this task of investigation, and the eight commissioners appointed, after holding an extensive series of sittings in the maritime provinces, compiled a report and submitted recommendations which have been the basis of subsequent lobster regulations, and, indeed, are in the main still in force. The report of that commission is of exceptional value, and in its pages are to be found a review of the lobster fisheries as a whole, with interesting details of the life-history, hatching, &c., of the lobster, and a series of appended suggestions bearing more or less intimately on the industry investigated. Reference to this report has been found by us to be most helpful in our present inquiries.

In 1903, a commission was appointed to report on the sardine fisheries of the Bay of Fundy, but in view of urgent representations by the fishermen, it extended its scope so as to include the lobster fisheries, and it carried out its inquiries beyond the limits of the Bay of Fundy, as far as the Magdalen Islands. This commission gave in twenty-three recommendations, of which eight have direct reference to the lobster industry, summarized as follows:—

Lobster Fishing Seasons.

(1) Two seasons recommended on Magdalen Islands, April 20 to July 10 and September 1 to September 30.

(2) Change season in St. Mary's Bay, Digby Co., N.S., from December 1 to May 30, the present season, to January 6 to June 15.

Lobster Pounds.

(3) Establish lobster pounds on Magdalen Islands and pay fishermen slightly higher than market prices for berried lobsters.

(4) Establish lobster pounds in Digby, N.S., and Charlotte counties, N.B.

(5) Prohibit parties from impounding lobsters excepting in proper pounds and cars approved by department.

More Effective Lobster Protection.

(6) Enforce lobster regulations more effectively especially in the lagoons, Magdalen Islands. (The law prohibits lagoon-fishing.)

(7) Require custom clearance for vessels shipping live lobsters certifying that no berried or immature lobsters are in the cargo.

(8) Government should consider the advisability of a 10½-inch lobster size limit in waters west of Halifax.

In 1909, a Select Standing Committee of the Dominion House of Commons was authorized, and its first work was to make a full and comprehensive inquiry into the lobster industry by summoning before it the Commissioner of Fisheries and subordinate officers of the Department of Marine and Fisheries, and a large number of the leading men engaged in the industry on the Atlantic shores. The evidence pub-

lished by that committee is of much interest and importance, but the members of the committee found it impossible for them to make an exhaustive report until certain aspects of the industry had been still further investigated, and as a consequence Dr. William Wakeham, officer in charge of the gulf fisheries division of the province of Quebec, was appointed to make a tour of the maritime provinces and hold in each county where lobster fishing was carried on sittings for hearing evidence. Dr. Wakeham, on January 6, 1910, gave in a report which in some respects followed the same lines as the commission's report of 1898, but added a number of new suggested regulations to which reference may here be made. Dr. Wakeham in his report regarded as necessary no less than seven coast divisions in each of which a different close season seemed appropriate. As a matter of fact, ten such divisions were established by the Department of Marine and Fisheries, owing to the circumstances that some of Dr. Wakeham's recommendations were amended before being adopted in order to meet alleged peculiar local conditions. Dr. Wakeham also urged that a standard lobster trap be required to be used all along the Atlantic shore, such trap to have a clear space of 1¼ inches between the laths when in use and a mesh of 3 inches at the ends where netting is used; also that fishing in lagoons or shallow bays with narrow inlets be prohibited, and that no fishing be allowed in less than two fathoms of water, as indeed the commission of 1898 had already recommended. All size limits were recommended to be abolished excepting on that portion of the shores of the maritime provinces within the limit of the county of Charlotte, N.B.; and Dr. Wakeham laid stress on the rigid protection of berried lobsters, such lobsters to be replaced carefully in the water by the fishermen on the grounds where the lobsters are being fished.

These seven separate investigations have, in the opinion of a great many fishermen and others interested in this industry, left the regulations of the shell-fish fisheries as a whole in a far from satisfactory condition. Hence, the appointment of the present commission has been generally hailed with much satisfaction and it is only just to the fishermen and to the parties interested in the industry to say that the visits of the present commission to the various points along the coasts of the maritime provinces have created great interest, and the sittings held have been in every respect most successful.

THE PRESENT COMMISSION.

In the report which we now make, we give a detailed account of the salient points which came before us, and we add at the close of this narrative our recommendations, together with such reasons therefor and remarks thereon as have appeared to us just and necessary.

IMPORTANCE OF SHELL-FISH FISHERIES.

The shell-fish fisheries of Canada rank amongst the first in the great fishing industries of the Dominion. They indeed take a place second only to the important salmon industry, for their value is no less than $5,394,535 annually. Of the total value just mentioned, the lobsters contributed the major part, namely $4,790,203, while clams and quohogs are returned as of the value of $332,803, oysters $212,296, and cockles, crabs and other shell-fish $59,733. The figures for 1911-12 exceeded the great cod industry by over a million dollars, and were exceeded by the salmon industry only, which has reached the high value of $10,333,070 (1911-12).

GREAT LOBSTER AND SHELL-FISH RESOURCES.

It may be justly claimed that no lobster fishery in the world can compare in extent with that of Canada. Lobsters and edible shell-fish occur everywhere along the Atlantic coast of the Dominion. Fifty years ago they occurred in incredible abundance on every part of the shore, lobsters being plentiful as far north as Chatetu

Bay in Labrador. Indeed so plnetiful were lobsters half a century ago that the fishermen regarded them almost as pests and it was a daily occurrence for the trap nets and weirs set for salmon, mackerel, &c., to be crowded with lobsters, and they were such a nuisance and of so little value that they were wantonly destroyed or carted on to the land as manure for fertilizing the fields.

FIRST CANNING OPERATIONS.

It is stated on reliable authority that lobsters were packed in cans nearly seventy years ago in Nova Scotia. The first canning establishment was at Liverpool, N.S., and the lobsters were put up in one pound, two pound and three pound cans and packed in cases containing 24 and 48 cans. The pioneers were Messrs. Mitchell and McPherson, who originally came from Aberdeen, Scotland. For many years the industry was a limited one, and packing establishments occurred at three or four points. In 1851, Mr. A. C. White, who came from Haverhill in Massachusetts, packed lobsters at Yarmouth and later at Port Matoun. 70,000 cans were shipped to England in 1864; and a little later Messrsr. Hamblin, Baker & Co., who had established a factory at Sambro, near Halifax, put up annually about 140,000 cans.

In 1867, Mr. T. F. Knight in his report on the fisheries of Nova Scotia, said:—

> The only trade in shell-fish of any importance in Nova Scotia is the lobster trade. They are preserved in tins or cans, and within a few years the quantity thus exported in 1864 and 1865 amounted to $51,872, four-fifths of which was exported to Great Britain.
>
> Lobsters are taken in Nova Scotia, generally by means of a net stretched on a hoop, in the centre of which the bait is placed. This net is attached to a line which is pulled up when the fish have attacked the bait. One fisherman will often have twenty or more of these nets attached to a cable suspended at the surface. In England, lobsters are most commonly taken in pots and creels. * * * * *
>
> There is a machine also used in Nova Scotia, constructed on a similar principle to a lobster pot. It is a cage made with laths with an entrance at each end; it is called a lobster trap. It is not much used, being considered an expensive appliance.

Improved forms of this type of lobster pot have come into universal use and have replaced the simpler and older forms of lobster gear.

By the year 1870 the lobster pack exceeded five million cans, and in the following year had more than doubled, while in 1881 it reached 17,000,000 cans.

About the year 1873, the fishery had assumed sufficient importance to attract more than ordinary attention. It was at that time prosecuted chiefly on the coasts of Nova Scotia and New Brunswick, where there were in the former province about 40 and in the latter about 24 canneries in operation. On Prince Edward Island canning operations commenced about forty years ago. These are said to have used about 12,000 tons of raw material, and to have exported to the United States about 2,000 tons of canned lobsters, smaller quantities having been consigned to other markets. The value of the lobster catch cured in 1873 was $1,214,749.50, while about $120,000 worth were disposed of in a fresh state.

In view of the fact that excessive fishing had exhausted the lobster fishery along the northeastern coast of the United States, and that the enterprise therein embarked in had been transferred to Canada, the government was impressed with the necessity of some measures designed to protect and perpetuate the natural supply by some appropriate regulations.

Thus the experience of the United States was sufficient to suggest some deterrent measures to avoid in Canada a repetition of conditions there. It was appreciated at the time that it was easier to exhaust a resource such as the lobster fishery than it would be to revive it after the event. Hence the necessity for some timely precautions.

FIRST CANADIAN LOBSTER FISHERY REGULATIONS.

This consideration of the matter was productive of the first fishery regulation concerning the lobster industry that was ever adopted under the authority of the Fisheries Act, and because it was the initial legislation in this regard, its substance is here given. The Order in Council was dated July 7, 1873, and the essential part was as follows:—

'In the provinces of Quebec, Nova Scotia and New Brunswick no person shall at any time fish for, catch, kill, buy, sell or have in possession any soft shell lobsters or female lobsters with eggs attached; nor shall lobsters of a less weight than one and a half pounds be at any time fished for, caught, killed, bought, sold or had in possession; but when caught by accident in nets or other fishing apparatus lawfully used for other fish, young lobsters of less weight than one pound and a half shall be liberated alive at the risk and cost of the owner of the net or apparatus, or by the occupier of the fishery, on whom, in every case shall devolve the proof of such actual liberation.'

This caused strong remonstrances from various quarters, the chief objections emanating from proprietors of canning establishments, because of the effect of the regulation in curtailing the supply of raw material which could, under the restrictions imposed, reach their canneries; nor was there any lack of objection on the part of the fishermen.

Prominent among the remonstrances were petitions from western Nova Scotia; the reasons set forth being: (1) the majority of lobsters taken were under 1½ pounds weight; (2) the lobster, unlike the salmon, was not confined to any particular locality, but was a denizen of the vast ocean and not likely to decline; (3) the capture of these shell-fish was to take wealth from the ocean and add to the riches of the country, which was no loss to the ocean owing to tremendous reproductive powers, and if not taken may never revisit the same place; (4) every average catch of lobsters was composed of ones less than 1½ pounds weight; (5) it would deprive those engaged of their livelihood and destroy a fast-growing industry; (6) a somewhat similar law recently became a dead letter in the United States.

LOBSTER LEGISLATION 1874 TO 1910.

Following strong representations by a deputation of persons engaged in the lobster fishery, the Order in Council of July 7, 1873, was rescinded and replaced by an Order in Council of April 23, 1874, which read as follows:—

'In the provinces of Quebec, Nova Scotia and New Brunswick, no person shall during the months of July and August, fish for, catch, kill, buy, sell or have in possession any soft shell lobsters, or female lobsters with eggs attached, nor shall lobsters of a less size than nine inches in length, measuring from head to tail, exclusive of claws or feelers, be at any time fished for, caught, killed, bought, sold or had in possession; but when caught by accident in nets or other fishing apparatus, lawfully used for other fish, lobsters with eggs attached, soft shelled and young lobsters of less size than nine inches in length shall be liberated alive at the risk and cost of the owner of the net or apparatus, or by the occupier of the fishery, on whom, in every case, shall devolve the proof of such actual liberations.'

The year previous, 1873, the legislature of the State of Maine passed the following law:—

'Section 1. No person shall catch, preserve, sell or expose for sale, within the limits of the State of Maine, any lobsters between the first day of August and the fifteenth day of October of each year; and from the said fifteenth of October to the first day of April next following of each year, no lobster shall be so caught, preserved, sold, or exposed for sale, under ten and one-half inches in length, measuring from one

extreme of the body to the other, exclusive of claws or feelers; but from the said first day of April to the first day of August of each year there shall be no such restriction as to time or size, in the taking, preserving, selling or exposing for sale such fish.

'Section 2. Any person violating any provision of the above section shall be punished by a fine of ten dollars for every such lobster so caught, used, sold, or exposed for sale as aforesaid; one-half to the person making the complaint and one-half to the use of the town in which the offence is committed.'

It may be here explained that the Fisheries Act, Chapter 45, of the Revised Stautes of Canada, empowers the Governor in Council to make regulations for the better management and regulation of the sea coast and inland fisheries, which shall have the same force and effect as if enacted therein, on publication in the *Canada Gazette*.

It is by virtue of this authority that the regulations controlling lobster fishing operations are framed.

The following is a short resumé of the various close seasons and other prohibitions from the beginning, bringing them down to the restrictions under which the lobster fishery is now conducted, and therefore of interest here:—

1873.—There was no close season; but it was forbidden to take or possess soft-shelled and 'berried' lobsters, and those under one and a half pounds in weight.

1874.—The months of July and August were established as a close season, and a legal size limit of nine inches introduced. Other prohibitions retained.

1876.—The above close season was changed to from July 10 to August 20, and the remainder of the maritime provinces. Other prohibitions retained.

1877.—Sectional close seasons introduced from August 1 to 31, for Nova Scotia, Prince Edward Island, and the southern coast of New Brunswick; and August 20 to September 15 for Quebec and the northern coast of New Brunswick. Other prohibitions retained.

1879.—Close seasons changed April 1 to August 1 for the western coast of Nova Scotia and New Brunswick; and April 20 to August 20 for Quebec, Prince Edward Island and the northern coast of New Brunswick. Other prohibitions retained.

1887.—Close seasons changed July 1 to December 31 for Atlantic coast from Cape Canso to United States' boundary line; and from July 15 to December 31 for the remainder of the maritime provinces. Other prohibitions retained.

1889.—Same dates as above continued; but the size limit was changed to nine and one-half-inches. Other prohibitions retained.

1891.—No change in close seasons or other prohibitions; but the legal size limit was put back to nine inches.

1893.—An experimental Order in Council was adopted for the province of Prince Edward Island providing that the two lowest laths of slats on each side of every trap should not be less than 1¼ inches apart. This was not found effective and was discontinued after 1894.

1894. —Regulations of 1891 unchanged; but lobster fishing was prohibited in the lagoons of the Magdalen Islands, and the use of trawls for lobsters was prohibited in Gaspe and Bonaventure counties, in Quebec.

1896.—A special regulation was passed to meet local conditions on Prince Edward Island obtaining at that time in Egmont and Bedeque bays.

The control of the canneries by law became essential, and the first Canadian legislation in that direction was an amendment to the Fisheries Act—57-58 Victoria, Chapter 51—assented to July 23, 1894. It was, however, found to be too cumbersome, containing unnecessary provisions and details, and was, in the following year (1895) repealed, and the law at present in force—amendment 58-59 Victoria, Chapter 28, 1895—substituted in lieu thereof. This legislation forms sections 35 to 42 and 76 to 82 of Chapter 45 of the Revised Statutes of Canada.

For convenience it may be briefly epitomized as follows:—

Section 35. Prohibits the canning or curing of lobsters except under license from the Minister of Marine and Fisheries.

Section 36. Fixes the fee at $2 per 100 cases, or fraction thereof, each to contain forty-eight one pound cans or ninety-six half pound cans.

Section 37. Forbids the removal of cases of canned lobsters from the canneries without being stamped with the government label.

Section 38. Provides that cases imported into Canada must be labelled or stamped with the government label.

Section 39. Imposes an annual return from each cannery by September 1 in each year, of number of fishermen employed, number of traps used, number of persons employed, distinguishing sexes, and number of cases packed, together with any other details which might be required from time to time.

Section 40. Imposes the obliteration and destruction of government labels on empty cases.

Section 41. Requires production of license on demand by a fishery officer.

Section 42. Imposes preservation and delivery to fishery officers, on request of all eggs attached to lobsters brought to the cannery.

Sections 76 to 82. Provides penalties for breaches of above provisions.

It will be observed that the above Act refers solely to the control of lobster canneries entirely separate and distinct from the regulations previously cited under which the lobster fishing operations are conducted.

As a result of the report of the Lobster Commission, 1898, a complete readjustment of the close seasons and size limits was effected by Order in Council, December 7, 1899, and April 8, 1903, and subsequent minor changes so that the regulations affecting the lobster fishery at present existing are:—

No. of District or Section.	Limits of District.	Close Season.	Size limit.
1	Counties of Yarmouth, Shelburne, Queens, Lunenburg, and part of Halifax to Halifax Harbour, N.S	June 1 to Dec. 14....	9 inches.
2	Counties of Charlotte, N.B., and Digby, N.S	June 16 to Jan. 5.. .	9 "
3	County of St. John, N.B	June 30 to Jan. 5*...	9 "
4	Bay of Fundy, part counties of Albert, N.B., Kings and Annapolis, N.S	June 30 to Jan. 14..	10½ "
5	From Halifax Harbour, including Guysborough County, to and through the Gut of Canso, then to Red Point, Richmond County	July 1 to March 31..	8 "
6	Gulf St. Lawrence, comprising the Counties of Inverness, Antigonish, Pictou, Colchester and Cumberland in N.S., Westmorland (see No. 7), Kent, Northumberland, Gloucester and Restigouche in N.B., and Bonaventure and Gaspé in Quebec	July 11 to April 19..	8 "
7	Excepting that portion of the Strait of Northumberland between N.B. and P.E.I., from Chockpish River to Cape Tormentine in N.B., and from West Point to Cape Traverse in P.E.I	Aug. 11 to May 24..	8 "
8	From Red Point, Richmond County, north to Cape St. Lawrence, comprising also Cape Breton and Victoria Counties, then in Saguenay County, P.Q., from Pt. de Monts eastward, Labrador, including Anticosti Island...	Aug. 1 to April 30. .	8 "
9	Around all the Magdalen Islands, P.Q., including Bryon and Bird Rock	July 11 to Aug. 31,.. then from Oct. 1 to April 19.	8 "
10	P. E. Island (except as provided in No. 7)	July 11 to April 26.	

* Except in portion of Digby Co., fronting Bay of Fundy, where the size limit is 10½ inches.

The regulations included the following prohibitions:—

(*a*) The capture of soft-shelled and 'berried' lobsters.

(*b*) The selling or offering for sale or barter, and the supply or purchase, for canning purposes, of any fragments of lobsters or broken meat.

(*c*) The setting or placing of lobster traps, &c., within one hundred yards of any stationary salmon net.

(*d*) The setting or placing of lobster traps, &c., in any waters of the depth of two fathoms or under.

(*e*) The boiling of lobsters on board of any ship, vessel, boat or floating structure for canning purposes, except under special license.

NOTE.—Such licenses have never been granted.

(*f*) The preparation for lobster fishing by placing gear of any kind before six o'clock in the morning of the day on which the legal season opens.

(*g*) Fishing for lobsters in the lagoons of the Magdalen Islands.

(*h*) The use of trawls for lobster fishing in Gaspé and Bonaventure counties, Quebec.

The penalty for a breach of these regulations or any of them is provided by the Fisheries Act, as not exceeding one hundred dollars and costs or imprisonment not exceeding three months, accompanied by liability to confiscation of vessels, boats and fishing gear illegally used.

LEGISLATION TO CONTROL CANNERIES.

It was early recognized that the main difficulty in the way of proper protection to the lobster fishery was to be found in the canning phase of the industry, for although no expedient presented itself, forming so important a factor in protection as the imposition of a size limit, looking to the prevention of the destruction of the fish before the age of reproduction had been reached, it was nevertheless apparent that the condition of the canning business admitted of, if not indeed effected the packing of everything large and small which came to the 'pots' or traps. Hence, without some machinery for the control of the canning operations, it was hopeless to expect any reasonable enforcement of a size limit, or indeed any other regulation designed for the protection of the fishery.

The same evil was not encountered where the trade was confined to live lobsters, because the article was not marketable unless of a reasonable and acceptable size, which made it in the interest of the fishermen as well as the trader to avoid capturing and placing on the market unsaleable lobsters, and these interests working in harmony with that of the lobster fishery, afforded, in a considerable measure, the assistance nature required to keep up an equilibrium between the supply and demand.

COASTAL DIVISIONS FOR LOBSTER REGULATION AS SUGGESTED BY COMMANDER WAKEHAM, M.D., IN HIS REPORT DATED JANUARY 6TH, 1910.

Suggested Coastal Divisions.

Division No. 1.—All that portion of coast from the boundary of the State of Maine, east and north to a line running in a southeasterly direction seawards from St. George's Island, Halifax Harbour, this to include the waters about Grand Manan, the Bay of Fundy and St. Mary's Bay, being division 'A' as outlined in the report of the Lobster Commission of 1898.

Division No. 2.—The waters east and north of the line running out of Halifax Harbour, including all that part of the coast of Nova Scotia, extending to the Gut of Canso and including the waters of the Gut to its western end and all that part of Richmond county to Red Point, being subdivision 'B' of the Lobster Commission of 1898.

Division No. 3.—All the waters of Cape Breton from Red Point, extending along the east and north shore to Cape St. Lawrence, being subdivision 'C' of the Lobster Commission of 1898.

Division No. 4.—The waters of Cape Breton south from Cape St. Lawrence to the western entrance of the Gut of Canso, the shore of the mainland of Nova Scotia from the western end of the Gut of Canso to the boundary line between that province and New Brunswick. All the waters of Prince Edward Island, save that portion extending in the Strait of Northumberland from Carleton Head to West Point. All the waters of northern New Brunswick from Cockfish river, north and west to the mouth of the Restigouche river, and all the waters of the province of Quebec fronting on the county of Bonaventure and the mainland of Gaspé county.

Division No. 5.—The waters of the Strait of Northumberland comprised within the line drawn from the boundary between the provinces of Nova Scotia and New Brunswick to Carleton Head, Prince Edward Island, and extening west to a line drawn from Chockfish river to West Point, Prince Edward Island, being subdivision 'B' of the Lobster Commission of 1898, extended from Cape Tormentine east so as to include the coast line of New Brunswick up to its eastern boundary.

Division No. 6.—The waters of the Magdalen islands.

Division No. 7.—The waters of the county of Saguenay, on the north shore of the gulf, including the Island of Anticosti.

The following regulations to be enforced in the above divisions:—

Division No. 1.—Fishing to begin on November 15 and end on May 1, with a size limit of ten and one-half inches, or better its equivalent, of four and three-quarter inch carapace measurement. In the county of Charlotte, New Brunswick, I would prohibit the canning of lobsters, as if they are permitted to be canned there will be smuggling of undersized libsters from the waters of Maine. If it is founl profitable for lobster dealers or fishermen to hold legal lobsters in licensed pounds during the legal season, so that they may be held and shipped as the market demands, I see no objection to this permission being granted, all lobsters held in these pounds to be liberated at the close of the open season.

Division No. 2.—A season extending from April 1 to June 15, with no size limit.

Division No. 3.—A season extending from May 1 to July 15, with no size limit.

Division No. 4.—A season extending from April 20 to July 1, with no size limit.

Division No. 5.—A season extending from August 10 to October 15, with no size limit.

It is hard to admit that it is right to permit the fishing and canning of lobsters in the Strait of Northumberland during the month of July. If the season, as above stated, is not acceptable, then the same dates as defined for the rest of the island and northern New Brunswick should be made to apply in this district. A great many fishermen on both shores favour a later fishing season than that now in force. Possibly even a two weeks later season above suggested would be better from a protective point of view. There is also a question as to whether the fall season would not be the best for the whole south shore of the island.

Division No. 6.—A season extending from May 1 to July 20, with no size limit.

Division No. 7.—A season extending from May 20 to August 1, with no size limit.

The use of a standard trap to be everywhere enforced after two years' notice, to have a clear space of one inch and a quarter between the slats when in use, and a mesh of three inches,—extension measure—in the ends, when netting is used, and no other kind of engine to be used anywhere for the taking of lobsters.

No fishing for lobsters to be permitted anywhere in less than two fathoms of water and no fishing in lagoons or shallow bays having narrow inlets, where the lobsters do not winter and in which they seem to seek asylum during the warm weather of July, August and September.

The berried lobster to be everywhere rigidly protected. The lobster to be replaced carefully in the water by the fishermen on the ground where the trap is being fished. The number of these lobsters taken during the season is not so great that the fishermen will lose much time in placing them carefully back in the water.

As already stated the Select Committee of the House of Commons considered further amendments of the lobster regulartions and the changes decidel upon were adopted in 1910.

This committee devoted practically the whole of its time during two sessions of parliament to a consideration of the matter, and had the advantage of having the special commissioner appointed as before stated, to go round the whole coast during the recess and take evidence from those interested in the industry. In accordance with the recommendations of this committee, the regulations were amended in 1910, the changes being the abolition of the size limit, except in the counties of Charlotte and St. John, N.B., where there are no canneries, and the substitution for it of a standard trap, having spaces between the laths of one and a quarter-inch and three-inch mesh netting in the heads. Existing traps were to be allowed to be used until the end of the present season, but all new traps made after the year 1910 were to be in accordance with the above requirements.

OYSTER AND CLAM REGULATIONS, 1865-1907.

The importance of protecting by regulations the oyster resources of Canada was realized over eighty years ago, and in William IV's reign a colonial Act was passed for Prince Edward Island to prohibit the burning of live oysters for making lime as a fertilizer, and oyster fishing was confined by law to residents in the colony.

In 1865 regulations providing for leasing certain areas, to be secured by auction and for encouraging oyster culture on creeks and water-frontage grants were passed.

On September 18, 1865, an Act was passsed amending the Consolidated Statutes of Canada so as to enable the spending by the Commissioner of Crown Lands, in the formation of oyster beds and the restocking of exhausted fisheries, of a sum not exceeding $1,000 per year.

This provision was continued and amplified following confederation by 'An Act for the Regulation of Fishing and protection of Fisheries,' assented to May 22, 1868, subsections 5 and 6, section 15 of which read as follows:—

> '5. The minister may authorize to be expended annually any sum appropriated by parliament for the formation of oyster beds in various waters, and places found adapted for that purpose, and transplanting oysters, and towards restocking exhausted fisheries by natural or artificial means. * * * *
>
> '6. With a view to protect the oyster beds in different parts of the bays and coasts of the Dominion, it shall not be lawful for any person to take oysters, or in any way to injure or disturb such oyster beds, excepting during times and on terms permitted by regulation or regulations under this Act, under a penalty of not more than one hundred dollars nor less than forty dollars, together with the forfeiture of the vessel and all the apparatus employed therein, and in default of payment, the party convicted shall be imprisoned for not less than one month, nor more than two months.'

and on May 28, 1868, an order in council was approved, under the authority of the Fisheries Act, providing a close season for oyster fishing, from June 1 to September 1 in each year.

No further change was made in the law until August 8, 1885, when an order in council was approved, amending the one above cited, so as to extend the close season for oyster fishing to September 15 in each year.

This amended close season was continued in the Consolidated Fishery Regulations of July 18, 1889.

On September 1, 1891, an order in council was approved, setting apart a certain area in Shediac harbour, New Brunswick, for the purpose of natural and artificial oyster culture.

On February 9, 1892, an order in council was adopted prohibiting oyster fishing through the ice.

On December 16, 1892, the order in council of 1891 was amended so as to increase the area set apart in Shediac harbour, and in 1913 a proper code of regulations drafted by Capt. Ernest Kemp, official oyster expert, was adopted which were as follows:—

'No person shall fish for, or catch, oysters without a lease or license from the Minister of Marine and Fisheries.

'2. The owner, person or persons interested in a fishing boat employed in the oyster fishery shall cause a memorandum in writing, setting forth the name of the owner, person or persons interested, to be filed with the local fishery officer, who, if no valid objection exists, may, under instructions from the Minister of Marine and Fisheries, issue a fishery license for the same, and any boat or fishing apparatus used without such license, shall be deemed to be illegal and liable to forfeiture, together with the oysters caught therein, and the owner or person using the same shall be subject to the penalties prescribed by the Fisheries Act.

'3. All boats fishing for oysters shall have a registration number corresponding with that of the license legibly marked or printed on the bow of the boat, in white coloured letters on a black ground, and the intital letter of the port to which such boat belongs, such letters to be at least eight inches in length.

'4. Oysters shall not be fished for, caught, killed, bought, sold or had in possession between June 1 and September 15, in each year, both days inclusive.

'5. Fishing for oysters, or any other shell fish through the ice is prohibited.

'6. No person shall fish for, catch, kill, buy, sell or have in possession any round oysters of a less size than two inches in diameter of shell, nor any long oysters measuring less than three inches of outer shell.

'Round oysters of a less size than two inches in diameter, and long oysters measuring less than three inches on the outer shell that may be accidentally caught, shall be returned to the water alive, at the cost and risk of the person so fishing, on whom, in every case, shall devolve the proof of actual liberation.

'Provided always, that persons holding fishery licenses may obtain from the Minister of Marine and Fisheries, permission to fish for and catch small oysters for the purpose of planting or stocking oyster beds.

'Fishing for oysters is prohibited on Sunday, and from sunset to sunrise on any other day of the week.

'8. No person shall dig mussel mud within two hundred yards from any live oyster bed, and then only at such place or places as may be prescribed in writing by a fishery officer.

'9. The use of rakes for the purpose of taking oysters on any beds prepared or planted by the Department of Marine and Fisheries, is prohibited.'

On February 7, 1894, an area in Tracadie harbour, Antigonish county, Nova Scotia, was set apart for the natural and artificial propagation of oysters.

On September 10, 1896, the use of drags or dredges on the public beds of Prince Edward Island, was prohibited for that season.

This regulation was repeated for the season of 1898 by order in council of June 20 of that year, and again in the seasons of 1900 and 1901 by orders in council of March 27, 1900, and May 11, 1901.

On September 13, 1901, an order in council was adopted extending the close season to September 22, and on May 21, 1905, it was still further extended so as to prohibit fishing from May 21 to September 22, both days inclusive, it being provided that the change would be effective in Richmond bay, Prince Edward Island, only, in 1904, and elsewhere in 1905, and the size limit for oysters was increased to three inches for round oysters and 3½ inches for long oysters. It was, however, provided that the minister might give permission to take small oysters for stocking purposes.

About the year 1900, the quahaug or hard-shell clam fishery, which previously had been carried on in a small and desultory way, sprang into prominence, following the opening therefor of large and remunerative markets in the United States, and in the course of a few years, it by far outstripped the oyster fishery both in volume and value. As a natural consequence, the fishermen in many localities concentrated their energy on the quahaug fishery, and desired to be allowed to take quahaugs wherever they could be found, regardless of the effect upon the oyster fishery, as it was entirely of secondary value.

An order in council was accordingly approved on October 22, 1901, providing that fishing for quahaugs in the bays, harbours and other waters of Canada, where oysters were taken, should be restricted to areas marked out by the local fishery officer.

On November 14, 1901, to prevent further destruction of the beds in the locality by mud diggers, a regulation was adopted prohibiting mud-digging in a certain portion of Trout river, Prince county, Prince Edward Island; also in a portion of Bideford river in the same county.

As, however, the oyster fishery was still going down, on April 15, 1907, a regulation was adopted, extending the close season from May 21 to September 22, both days inclusive, to from April 1 to September 30, both days inclusive.

The fishing of oysters through the ice had already been prohibited and the effect of this regulation was to curtail fishing to what might be carried on between October 1 and the time the ice makes in the fall, which taking into consideration the tempestuous weather usually prevailing at that season of the year, limited fishing to about a month or six weeks in the year.

The same regulations, with a view to further safeguarding the beds and fishery, prohibited the use of any implements on oyster beds, other than the ordinary oyster tongs and rakes.

These regulations, with the various amendments, were embodied in the Consolidated General Fishery Regulations, adopted by order in council of September 12, 1907.

While the existing regulations limit oyster fishing to practically a month or six weeks, between October 1 and the time the ice makes in the fall—the weather usually being too stormy in November to permit of oyster fishing operations—and provide a size limit below which oysters may not be taken, in the earlier days it will be remembered that the only restriction on the fishermen was a close season from June 1 to September 15, there being no stipulation as to size, or fishing through the ice.

The result was that the fishermen, with little thought for the future, did not take time to cull their catches when on the beds; but took everything to shore, where culling took place, and the smaller oysters were then thrown away and wasted, instead of being replaced on the beds, and left there to maintain the future supply.

Great harm was also done the fishery by fishing through the ice. In this fishery a rake with curved iron teeth, and a handle about forty feet long was used. It was inserted through a hole cut in the ice, and the area round about, as far as the rake

would reach, was covered, thus not only breaking up the surface of the oyster bed, but bringing a pile of mud, shells, &c., immediately under the hole, and all small oysters taken were left on the ice to freeze and perish.

Captain Kemp estimated over twenty-five years ago that from 20,000 to 30,000 barrels of undersized oysters were being annually destroyed without benefit to any one, by being taken ashore and thrown away during the spring and autumn fishery, and left on the ice to perish during the winter fishery.

PRESENT CONDITION OF SHELL-FISH INDUSTRIES.

The wonderful productiveness of the Canadian shores is such that the lobster industry is still carried on on a vast scale, and the total money value of the lobster fishery is greater than ever, though in the opinion of the best informed persons the resources are being so seriously trenched upon that unless effective measures for restoring the lobster supply are taken without delay the industry must ere long cease to be profitable.

The annual returns, though showing a very large increase in the money value, are really misleading, because while the supply of lobsters is declining the price has so materially advanced that the total value is greater to-day than at any previous period. Thus, in 1880 lobsters brought $5 a case, whereas last year the price realized was nearly four times that amount.

In the case of the oyster, though the number of barrels annually produced on the Canadian beds is only half what it was ten years ago, the price per barrel has increased in about the same ratio as the price of lobsters, and is now four or five times what it was at the time just referred to.

The following points are worthy of attention in considering the present condition of the shell-fish industries:—

Lobster.—1. The size of lobsters has materially declined, great catches being of very much smaller average size than in former years, while the fishing operations are carried on over a very much larger area, and with increased gear and in deeper water, and in most districts with the assistance of motor boats the use of which allows a greatly increased number of traps, but the catches have not correspondingly increased with the increase in the amount of gear.

2. The traps used are more effective and destructive than formerly, and the parlour and other forms of trap have replaced the old-fashioned lobster pot used in past years.

3. There is a tendency in some localities to increase the small canneries and in such canneries to either pack the fishermen's catches on share or to pack them for the fishermen, charging a rate agreed upon for the cost of cans and the labour.

4. While the size limit has been ignored, and was practically a dead letter when various size limits were in force in the different lobster districts ,the fishermen realize that the taking of small lobsters has been detrimental. In such localities as the shores of Grand Manan a large size limit seems to have been observed by the fishermen, and it is a widespread opinion that by returning small lobsters to the water and marketing only the large lobsters they have increased the prosperity of their fishery, but in general the fishermen do not favour a size limit and the canning industry would be endangered were the eight or nine-inch limit enforced generally; but all seem to be convinced that the berried lobster—the female lobster carrying eggs—must be protected, and three suggestions have been made to that end:—

(*a*) To erect hatcheries and extend present operations. In a great many localities the hatcheries now carried on are not regarded as very successful or beneficial to the industry; but in other localities fishermen favour the erection of new hatcheries.

(*b*) The establishment of lobster ponds, and the purchase of the berried lobsters from the fishermen, such lobsters to be replaced in the sea after the close of the fishing season.

(*c*) To require all fishermen to themselves replace berried lobsters in the sea, with or without compensation by the government.

Oysters.—Though the areas upon which oysters occur on our Atlantic coast extend over a great length of the shores of the maritime provinces, the productive natural beds are limited and scattered, but by the adoption of oyster culture they could be increased infinitely. No oysters equal the best Canadian oysters in delicate and attractive edible qualities, and the demand even in Canada has always vastly exceeded the supply.

The productiveness of the oyster beds has declined year after year. Why is this?

In the first place, the natural beds are comparatively small in area, and it is quite impossible to control the number of persons engaging in the fishery, as the beds are public property. Then, again, the fishery is of a character, and is carried on at a season that makes it readily possible for others than ordinary fishermen to engage in it, and with an increasing demand for oysters, at attractive prices, the incentive for taking this means of adding to the ordinary source of income, is not light. As the supply of oysters begin to fail, greater efforts are made to keep up at least the usual catch, and the whole oyster-producing area is so raked and re-raked that it is scraped bare of a sufficient quantity of mature oysters to sufficiently seed the beds.

While the statistics included in this report appear to indicate a comparatively steady fishery until recent years, it must not be concluded that the supply was kept up from the same beds. The fact is that as the larger and better beds became exhausted, those which at first were not considered worth exploiting were resorted to, and being smaller and not so productive, the sooner gave out. Also minor patches of beds were from year to year being found in the vicinity of the larger ones, which, owing to their insignificant size, had not previously been located, and being well stocked, aided in keeping up the supply; but as all such have now been located and worked, there is small reason to hope that the future can do otherwise than show a continual decrease in the present small yield, unless new methods are adopted.

The extraordinary productiveness particularly of some of the larger beds, notwithstanding excessive fishing from year to year is surprising.

But the causes of the depletion of Canadian oysters are many, and on referring to the annual reports we can at once see the wasteful methods which both oysters and areas have had to withstand. Oysters were taken, until a very recent date, all the year round, and of all sizes. During the fishing season, oysters were caught irrespective of size, but as these could not all be sent into the market, the small were culled out, and thrown up in piles to rot. This method was a case of wholesale slaughter, more oysters being destroyed than were actually sent into the market. As they were not nearly full grown, the result was heavy losses to the beds, which, of course, eventually seriously affected the obtaining of any considerable quantity of spat. The beds have also suffered considerably on account of being fished during the winter months through the ice, the large ones being culled out, the small ones left on the ice to perish with the frost and cold.

Another evil to which the Canadian oyster beds have been subject, is the system of mud-digging.

Annual production of lobsters canned and in the shell, 1897–1911.

Year.	Nova Scotia.		New Brunswick.		Prince Edward Island.		Quebec.		Total.	
	1 lb. cans.	lbs. in shell.	1 lb. cans.	lbs. in shell.	1 lb. cans.	lbs. in shell.	1 lb. cans.	lbs. in shell.	1 lb. cans.	lbs. in shell.
1897.	5,214,266	22,968,200	2,413,404	2,205,500	2,466,682	.....	1,036,202	9,400	11,130,554	25,183,100
1898.....	5,210,294	32,631,300	2,113,222	2,177,600	2,340,020	7,400	1,067,058	20,100	10,730,594	34,836,400
1899.....	4,837,402	13,446,200	2,177,106	1,996,500	2,421,144	4,600	1,059,658	12,500	10,495,310	15,459,800
1900.	5,263,780	16,919,600	2,038,692	1,972,900	2,223,712	13,500	1,022,106	8,000	10,548,290	18,914,000
1901.....	5,003,023	14,648,800	1,842,340	1,760,500	2,386,070	3,200	825,171	7,000	10,056,604	16,419,500
1902.....	4,637,204	12,090,200	1,965,296	2,085,300	2,039,603	22,400	708,018	5,500	9,350,121	14,203,400
1903..... ...	5,153,712	8,858,600	2,136,672	1,754,500	2,335,400	40,000	978,434	10,800	10,604,218	10,663,900
1904.....	5,357,454	9,251,300	2,055,100	1,688,200	2,501,100	153,300	848,634	12,000	10,762,288	11,104,800
1905.	4,917,148	13,487,100	2,249,440	1,852,000	2,182,624	35,000	1,148,412	18,300	10,497,624	15,392,400
1906.....	4,595,816	8,795,600	2,420,860	1,288,900	2,289,288	44,000	798,800	8,500	10,104,764	10,137,000
1907.....	4,270,326	8,427,900	2,731,012	1,240,100	2,839,489	72,000	819,723	9,000	10,660,550	9,749 000
1908.....	4,399,610	8,732,100	2,716,968	1,031,700	3,098,444	53,000	696,476	20,500	10,911,498	9,837,300
1909.....	3,794,422	8,196,000	2,079,660	1,908,900	2,255,898	185,000	941,620	104,300	9,071,600	10,394,200
1910..... ...	3,960,336	9,387,100	1,676,736	1,473,600	2,180,784	35,000	970,704	105,500	8,788,560	11,001,200
1911-12.....	4,631,906	9,865,900	1,807,872	1,117,100	2,481,264	63,300	1,086,096	3,600	10,007,138	11,049,900

RETURN showing quantity of Lobsters Canned in Counties on Atlantic Coast of District No. 2, Nova Scotia, from 1896 to 1912; also Live Lobsters exported.

Year.	Guysboro Canned.	Exported in Shell.	Halifax Canned.	Exported in Shell.
		Cwt.		Cwt.
1896	836,416	520	751,967	5,230
1897	933,572	1,140	537,552	12,197
1898	915,960	811	590,352	18,063
1899	825,936	2,282	473,384	13,073
1900	901,028	3,930	480,520	9,222
1901	672,240	3,168	440,784	12,842
1902	588,496	2,392	416,854	12,305
1903	543,196	2,673	432,624	9,563
1904	533,852	2,009	453,621	13,810
1905	494,500	9,895	407,380	21,541
1906	487,220	2,551	379,632	7,141
1907	401,848	3,429	322,488	11,297
1908	402,116	3,600	363,360	3,709
1909	298,436	2,982	252,508	4,588
1910	335,472	3,691	295,276	4,832
1911	350,064	6,688	273,792	7,853
1912	378,960	2,241	226,008	3,704

SCHEDULE showing quantity of Lobsters Canned in District No. 2, Province of Nova Scotia, in each year from 1896 to 1912; also Live Lobsters exported.

Year.	Lobsters Canned Cases 48 lbs.	Live Lobsters Exported.
	Cases.	Cwts.
1896	68,352	5,810
1897	58,005	13,502
1898	55,969	18,898
1899	54,223	15,765
1900	49,144	13,374
1901	51,586	16,160
1902	46,994	14,925
1903	42,343	12,551
1904	43,448	15,949
1905	42,931	31,841
1906	41,863	9,889
1907	38,999	15,880
1908	38,071	7,496
1909	42,216	7,820
1910	35,234	9,078
1911	37,555	15,041
1912	32,773	5,955

IMPORTS OF LIVE LOBSTERS INTO BOSTON, U.S.A.

The following figures kindly supplied to the commission from the statistical returns of the Boston Fish Bureau, are interesting as showing the advancing growth of the live lobster exportations from Canada year by year, especially during the last few years.

The price per crate (or price per pound) during the months of August, September, October and November, shows especially how increasingly valuable this shellfish is becoming and the demand in the future is likely to continue to expand.

BOSTON FISH BUREAU, BOSTON, MASS.

Year 1908

Months.	Home ports.	Foreign ports.	Price.
January	951	4,148	Large $20–28 crate, medium $14–16.
February	26	1,882	" 35–40 " " 20–25
March	133	2,688	" 21 35 " " 14–20.
April	22	5,470	21 14
May	113	7,755	10–14 8–12.
June	1,529	2,891	13–18 11–14.
July	1,487	423	18 15
August	2,263		13 to 14 cts. lb.
September	1,823		12 to 14 "
October	1,480		11 to 13 "
November	162		13 to 16 "
December	798	2,584	Large $13–$15 crate, small $8.
Totals	10,787	27,841	

BOSTON FISH BUREAU, BOSTON, MASS.

Year 1909.

Months.	Home Ports	Foreign Ports.	Price.
January	135	3,597	Large $18.28 crate, small $8.11.
February	601	2,476	" 28.30 " " 12.18.
March	458	2,849	" 21.30 " " 14.20.
April	165	8,262	" 12.21 " " 8.14.
May	196	9,335	" 12.00 " " 8.10.
June	1,352	4,281	" 14.21 " " 10.15.
July	1,413	139	" 21.23 " " 15.16.
August	1,588		16 to 18 cts. lb.
September	1,740		16 to 18 cts. lb.
October	1,656		15 to 19 cts. lb.
November	1,618		17 to 18 cts. lb.
December	458	3,073	Large $20 crate, small $12.
Totals	11,380	34,012	

BOSTON FISH BUREAU, BOSTON, MASS.

Year 1910.

Months.	Home Ports.	Foreign Ports.	Price.
January	112	3,942	Large $25.00 crate, small $10.12.
February	300	2,195	" $30.00 " " 14.20.
March	474	4,013	" 18.28 " " 14.20.
April	150	8,430	" 13.16 " " 9.12.
May	241	9,347	" 12.14 " " 10.00.
June	1,318	1,717	" 16.25 " " 12 18.
July	1,536	389	" 21.00 " " 15.18.
August	1,692		12 to 20 cts. per lb.
September	1,646		15 to 18 "
October	1,583		16 to 18 "
November	1,198		18 per lb.
December	650	2,997	Large, $20 per crate; small, $12–14.
Totals	10,903	33,030	

BOSTON FISH BUREAU, BOSTON, MASS.

Year 1911.

Months.	Home Ports.	Foreign Ports.	Price.
January	158	3,851	Large $25–$30 crate, small $12–$14.
February	317	2,506	" 30– 32 " " 18– 22
March	253	963	" 35– 50 " " 22– 35
April	72	6,702	" 14– 40 " " 10– 25
May	12	12,463	" 14– 15 " " 10– 12
June	704	3,529	" 10– 21 " " 13– 18
July	1,440	416	" 18– 22 cts. lb., small 14 cts. lb.
August	965	4	" 18– 19 " " 14 "
September	1,138		" 18– 22 "
October	1,901		" 18– 19 "
November	707		" 19– 20 "
December	74	773	" 16– 18 crate, small $10–$12.
Totals	7,741	31,248	

BOSTON FISH BUREAU, BOSTON, MASS.

Year 1912.

Months.	Home Ports.	Foreign Ports.	Price.
January	68	2,701	Large $22–32 Small $14–20 crate.
February	71	1,422	" 28–35 " 20–22 "
March	272	1,295	" 35–40 " 25–30 "
April	116	8,652	" 15–35 " 11–20 "
May	13	8,119	" 12–16 " 12–16 "
June	657	4,490	" 21–22 " 16–22 "
July	180	1,083	" 22 " 22 "
August	866		20 to 22 cts. per lb.
September	1,279		18 to 20 cts. "
October	764		19 to 20 cts. "
November			
December			

In addition to the quantities in the above returns, there is a considerable quantity of lobsters collected by United States' well-smacks, and afterwards impounded in lobster ponds in the State of Maine. Such shipments of Canadian lobsters do not appear in the foregoing statistics; but are included in the fishery returns of the State of Maine, thus helping to swell the annual catches of lobsters recorded in that State.

MEASURES TO SECURE THE PERMANENCE OF THE SHELL-FISH INDUSTRIES.

LOBSTER.

Were it possible to carry out all the measures which would preserve permanently the lobster resources of the Dominion, there is no doubt that the following steps should be adopted:—

1. A universal and simultaneous close season applicable in all the waters of the Atlantic shores of Canada.

2. One universal fishing season with a strict prohibition against any lobster gear being in the water before or after the specified limits of such fishing season.

3. The strict enforcement universally of the seed lobster, or berried lobster, prohibition.

4. The rigid observance of the large size limit, say 10 or 10½ inches, which would ensure that every female lobster had spawned at least once and probably twice.

5. A limitation to the number of canneries or lobster packing establishments.

6. A limitation to the number of traps, that is, the amount of gear placed in the water each season.

7. Confining lobster fishermen to their own localities, a limitation found desirable in the case of other sedentary fisheries.

OYSTER.

1. All areas on which oysters grow, and which are suitable for oyster culture, should be under strict surveillance, and if possible leased for cultivation by fishermen or by companies or private firms or by interested individuals. The existence of public beds practically open to everybody is really a benefit to no one and results in destruction and extermination of the oysters. It is the interest of no one to preserve oysters on a public bed, but to scrape up all he can and prevent other people getting them.

2. A proper size limit, and the return of under-sized oysters to the water.

3. A standard oyster barrel or box.

SCHEMES OF LOBSTER PRESERVATION.

Prof. Herrick in his well known and very complete report on the lobster expressed his view that the industry might be preserved by the adoption of one of the two following schemes:—

I. First Scheme.

(1) Prohibit lobsters 11 inches and upwards in length, and prohibit lobsters under 9 inches in length, that is taking legally only lobsters 9 to 11 inches in length.

(2) Protect seed or berried lobsters by paying a bounty to the fishermen for them, and thus secure the eggs which should be incubated in the government hatcheries.

(3) Abolish all close seasons and allow lobster fishing during the twelve months.

(4) Rear lobsters to the bottom-seeking stage, as at Wickford, R.I

(5) Compel every fisherman to take out a lobster fishing license.

(6) Require a standard trap with ring of such dimensions that large lobsters would be excluded and with a distance between the laths to allow small lobsters to escape.

II. Second Scheme (Alternative).

(*a*) Make 10½ inches the minimum limit for lobsters to be taken. (This will secure the largest production of young lobsters each year.)

(*b*) Require every lobster fisherman to take out a lobster license.

(*c*) Prevent the destructive interprovincial or interstates commerce in short lobsters whereby small lobsters may be legally handled in a province or state which has a large size limit, or which has no size limit, as in the interior provinces or states.

(*d*) Stop the liberation of larval lobsters immediately after hatching and rear lobsters as at Wickford, thus stocking the waters with lobsters able to protect and take care of themselves.

III. We cannot omit to mention the proposal advanced by Dr. Field, of Boston, namely, to prohibit the taking of large lobsters over 11 to 12 inches, and to protect very small lobsters, say under 7 or 8 inches, the former carrying a disproportionately large amount of spawn, while the latter, if protected, would have a chance to reach the spawning size. This plan of Dr. Field's could be carried out by simply specifying the minimum diameter for the ring and the mesh of net in the trap, and possibly also a wider distance between the laths; but it would no doubt be difficult to ensure the return to the water by the fishermen of any large lobsters which, by chance should make their way into the traps. There could be no doubt, however, of the benefit of Dr. Field's proposition if it could be carried out.

RELATION OF LOBSTER FISHING TO OTHER SEA FISHERIES.

One point has impressed itself upon us in the course of our inquiries, and that is the effect of the vast extension of the lobster fishery upon the deep sea and inshore fisheries generally. The lobster fishing has taken up more of the time of the men who would otherwise engage in cod or herring, halibut and other fishing, while there is no doubt that considerable injury resulted to these fisheries by the increased quantities of gear set and the continual hauling of traps all along the Atlantic shore. The men in their pursuit of the lobster fishery have neglected the greater industries in the deep sea, and a vast number of these men formerly pursuing the sea fisheries are now fitted neither with boats nor gear suitable for cod and other fishing. Lobstering is in many ways more readily carried on than the fisheries in deeper waters. The men can set their traps almost close to their doors and the lobsters when caught bring ready cash; but the genuine fisheries of the coast have suffered and the stagnation of the deep-sea fisheries of the maritime provinces, is largely due to this cause. There is much therefore to be said for the curtailment of the lobster fishery, either by limiting the season or otherwise, in order to encourage the men to occupy more time each year in the deep-sea fisheries. These neglected resources are awaiting exploitation, but so long as the lobster fisheries so prominently occupy the fishing population, stagnation will continue. We point this out because it has been claimed that any undue limitation of the lobster fisheries will have the most serious results on the fishing population. As a matter of fact it would compel a great many of the men once more to take up the legitimate deep-sea fishing.

MAINE LOBSTER FISHERY.

Owing to the proximity of the State of Maine to the important Canadian lobster areas, a brief review of the recent history of the Maine lobster industry is of value and interest. The live lobster business, as well as the canned lobster industries, have always been important in Maine, but the serious decline in the supply of lobsters led to the establishment of a 10½-inch size limit, and the closing down of the canning industry came about as a consequence of this law. It was not possible to continue

packing lobsters with the establishment of such a size limit, which is now 4¾-inch carapace measurement, equivalent to 10¼ to 10½ inches. There were in 1880, 23 canneries; in 1889, 20 canneries; in 1892, 11 canneries; and there have been none since 1895. The catch of lobsters is officially stated as follows:—

	Lbs.
1887	23,000,000
1888	21,700,000
1889	25,000,000
1892	17,600,000
1898	11,183,000
1908	12,500,000
1912	

The decline in the lobster resources of Maine during the years following 1887 appear now to have been arrested by (1) the size limit of 10½ inches, and (2) the protection of the berried lobsters. The enforcement of the size limit is actively pursued in the State of Maine as is shown by the fact that 37,000 small lobsters were seized in 1907, though it is estimated that a large number of short lobsters were taken and shipped into Massachusetts and New York States calculated at a value of about $40,000 on the basis of a price of four cents each, which if allowed to reach the legal size specified in the State of Maine would have been of a value of $230,000.

Formerly, lobsters for canning purposes ranged from three pounds upwards, but fell to three-quarters of a pound or less owing to the high prices paid for live lobsters by the live lobster trade, with which the canneries could not compete. A number of Maine canners have been moving to Canada, and they now own many canneries in the maritime provinces.

Lobster Ponds in Maine.—In 1875, Johnson & Young, Boston, started the first lobster pond, where lobsters, bought at low prices in the height of the season, are retained until winter when the price rises. These lobsters are fed on fish offal. In 1898, there were nine ponds in Maine, five to ten acres in area, but at the present time there are over twenty. Berried lobsters have also been largely imported from Nova Scotia and used for stocking the waters of the State of Maine, and their eggs have also been largely utilized for supplying the Maine hatcheries, and thus enabling the waters of this State to be planted annually with a vast number of young fry.

Other methods have been officially adopted in dealing with seed lobsters in the State: First, the State began by voting $5,000 per annum for purchasing seed lobsters from the fishermen and dealers, and they collected in one season over 11,000 lobsters. The Federal Government did a similar work, and the lobsters were taken to Boothbay Harbour, Maine, and the eggs hatched there in the establishment for incubating lobsters, and the fry replanted in the sections whence they were taken.

Secondly, a government pond for retaining lobsters to the number of 7,000 was established and the eggs carried through the winter.

Thirdly, berried lobsters have been bought from the fishermen and liberated in the localities where taken. In order to prevent the payment a second time for the same lobsters, a hole was punched in the tail, but few have been retaken, not more than one in seventy.

Maine Lobster Regulations.—The Maine lobster regulations have varied in recent years, so much so that it is difficult to summarize them. In 1878, canning, for instance, was limited to four months, April 1 to August 1; and there have been close seasons for fishing; but there is now no general close season, though the gear is actually out of the water in July and August as a rule, preparations being in progress for fall lobstering.

A 10½-inch limit (4¾-inch carapace) is in force. There is considerable trouble arising from the fact that the neighbouring State of Massachusetts has a 9-inch limit.

POINTS TO BE NOTED CHARACTERISTIC OF THE LOBSTER.

In discussing methods for preserving the lobster it is often forgotten that the lobster differs from many other valuable edible marine animals in important characters of which some may be named as such as the following:—

1. Lobsters are not of rapid growth, and take four or five years to reach mature breeding size.

2. The rate of reproduction is not as is often supposed enormous and does not compare with that of most other sea fish. It produces 10,000 to 30,000 eggs instead of 40,000 to 60,000 eggs as in the herring or many millions, three to nine millions in such fish as the cod, haddock, hake, &c., or the oyster which produces many millions annually.

3. Not all the eggs of the lobster are matured or hatched at the same time, often only a few fry emerge at a time, hence the risk and dangers are increased by this protracted hatching.

4. The growth of the adult lobster is not gradual as in most animals, but it suddenly increases from one size to the next by a rapid expansion in bulk. A 6-inch lobster at one step becomes 7½ inches; a 9-inch lobster becomes 10½ inches; and a 11-inch lobster becomes 12 inches, and so on. Each stage of growth being a time of helplessness and peril. The shelling act is perilous but the soft shell state following is no less perilous to its safety.

5. Lobsters are local. They do not wander widely and are not migratory over long distances. Swimming by means of the vigorous flapping of the tail is exhausting and ordinary walking is slow and laborious. A travelling lobster is an exception, hence a particular area can be cleaned out of its lobsters and they are not soon replaced or restored.

6. Most fishes drop or deposit their eggs but the lobsters carry for a long period their eggs. Hence the destruction of a female lobster with eggs means many thousands of young killed. In other marine animals as a rule the female may be destroyed but her eggs being laid or scattered survive, and keep up the supply.

LOBSTERS ARE NON-MIGRATORY.

Many fishes are characterized by a strong migratory instinct. They may appear regularly like salmon or smelt or mackerel, or migrate erratically like dog-fish, but a large variety of fishes are strictly local, and appear to move very little from their accustomed haunts. The lobster has been credited with moving in schools over considerable distances, but the general absence of the migratory instinct is now recognized by scientific specialists. It has been proved by experiments with tagged lobsters and it is supported by the fact that lobsters have been over-fished and certain areas cleaned out and they still show no restocking through the migration from other localities of fresh schools of lobsters. Areas where lobsters were once abundant remain comparatively barren. At times lobsters seem to violate the rule and may move over long distances in a remarkably short space of time. Dr. Herman Bumpus, at Woods Hole, Mass., showed in 1898 that as much as 15 or 16 miles have been traversed in three or four days, but such movements may be due to removal from their accustomed surroundings when they move or wander aimlessly like a lost dog covering long distances, or the change of temperature, currents of unusually cold or warm water, may drive them to more congenial temperatures. Occasional migration is of small significance compared with the prevalent fact that each portion of coast has its own local schools of lobsters.

ANNUAL *versus* BIENNIAL SPAWNING.

The idea has gained currency in recent years that the lobster spawns only in two years, though many authorities still adhere to the view that it is an annual spawner. Some observations by the chairman of this commission are of interest, and may be here quoted:—

When on the east shore of Cape Breton some years ago a number were examined of female lobsters at some of the canneries, and revealed the following facts:—

1. A 10-inch female lobster which carried eggs in which the embryo was distinctly discernible and which would hatch out very shortly, on being killed and opened was found to have ovaries, each of them 3 inches long, and the eggs quite defined in shape. This enlarged condition of the ovaries, and the condition of the contained eggs showed that the specimen must spawn in a less period than two years.

2. A 10½-inch specimen was also examined, and the eggs which she carried on the outside were so advanced that they would hatch within two or three weeks. The ovaries inside were 3 inches in length, and the specimen was evidently preparing to shell as a new shell was forming inside the old one.

3. An 11-inch lobster had got rid of her eggs, and there were only some remnants attached to the under side of the tail. The ovaries inside were very large, and the eggs clearly marked, and a new shell was forming underneath, as a thin skin which was in a more advanced state than the specimen last referred to, thus indicating that the lobster was about to shell within a short time, and had got rid of her eggs.

These specimens were examined on July 22, and fully support the view that the lobster spawns annually and not at the longer period of two years.

Before we proceed to set forth the main features, as national commercial enterprises, of the valuable lobster, oyster, and other fisheries, a few notes summarizing the results of scientific observations on the chief points in the life history, breeding, etc., of the various shell-fish referred to, including the hard-shell and soft-shell clam and the scallop, and some reference to the mussel, periwinkle, etc., are appropriate as a preliminary.

LIFE HISTORY OF THE LOBSTER.

STAGES OF THE YOUNG FRY SUMMARIZED.

Larval life—Seven stages.

The newly hatched larva exhibits a short shrimplike body and ringed tail stretched out almost horizontally. It is of glassy transparency, with gleaming emerald eyes, and possesses a huge pointed snout or rostrum, consisting of a central blade and a lateral spike on each side. Two pairs of very short horns protrude in front (antennæ and antennulæ), the second pair being forked or split into two. Four of the six tail-joints bear spines, two on each side, and one in the middle standing erect. Most young marine larvæ, having the pelagic habits of the lobster carry for some days a small bag of yolk; but all trace of the green yolk has disappeared by the time the young lobster hatches out. The yellow liver is plainly visible through the translucent shell. There are no swimmerets along the under surface of the tail; but minute buds indicate their future position. The jointed foot jaws and the five pairs of legs are paddle-like, and the creature shoots forward through the water with great rapidity. The triangular tail is provided with spines and is fringed with hairs. In length the larva is over ⅓ of an inch (7·50 to 8·50 mm. long) from the tip of the snout to the end of the tail.

(2) During the second week after hatching five changes may be noted: (*a*) the snout becomes toothed and is less blade-like in character; (*b*) paired swimmerets grow out along the underside of the tail—the second to the fifth tail rings; (*c*) green colour appears along the back region. The length increases by nearly one-twelfth of an inch, and the larva is now nearly half an inch long (9.50 to 111 mm.).

(3) During the third week the principal change is the development of the nipper-claws or chelae. All the feet hitherto were adapted for swimming and the first pair (or nippers) differed little from the rest; but at this stage they become proportionately much larger and their inner margins exhibit serrations or tooth-like projections. The eye still shows a bright metallic lustre, and green spots distinctly appear in the thin shell mingled with a brown colouration. This stage appears to rarely last more than a week.

(4) The fourth or fifth week witnesses further changes. In outline the small lobster shows a resemblance to the adult lobster greater than it has hitherto exhibited. It has, after moulting, increased in length, and measures more than half an inch (13 to 15 mm.). The erect spines down the back have gone, while a deeper colour, brown or green, extends over the shell, and the nipping claws are of a warm brown or reddish colour.

(5) The young lobster, six weeks to two months old, still swims about actively near the surface. Though its prevailing reddish brown tint renders it less conspicuous than in its younger stages when its glassy translucency is more marked, yet it is really a small insignificant object ¾ inch to ⅞ inch long, and not readily distinguished from the small fishes, young cod, gurnard, sculpins, &c., which abound in the same surface waters. A young lobster at this stage is often mistaken for a larval gurnard (*Prionotus*), as both swim rapidly forward in a similar way, and the moving reddish claws of the lobster bear no little resemblance to the orange tinted pectoral wings, or fins, of the minute gurnard. The snout is narrower and therefore appears more prominent and pointed, while the feathery outer joint or exopodite of the swimming feet becomes much diminished. This last feature, with the loss of the glassy translucency, characteristic of previous stages, indicates that the young lobster is about to take to the bottom.

Swimming larva descends to the bottom of the sea.

(6) One or two weeks later when the lobster measures a fraction more in length (15 to 17 mm.) it changes its swimming pelagic habit and comes inshore. Its colour is darker than hitherto, though there is great variation in this respect. Dark green, pale bluish or greenish brown are most frequent. As Professor Herrick points out, there appear at this time on the head shield two white spots, really points of internal attachment for tendons, very apparent a little behind the eyes. The projecting edge (pluron) on each side of the first tail ring is also white. The snout or rostrum measures about one-quarter of the length of the head shield (or cephalothorax).

(7) During the third month of larval life which Herrick divides into two stages, the changes are mainly internal, and only the trained specialist is able to notice the slight external modifications which take place. The most important point is the assumption of the external characters of sex. The males and females, in early larval stages, cannot be distinguished. Up to the sixth or eighth week the first pair of swimmerets beneath the tail are mere rounded tubercles, and up to the stage now described the oviducal openings on the second pair of walking limbs are not apparent in the female. They now appear distinctly, and from this stage onwards the changes which take place are mainly connected with growth and increase in size. The young lobster thus passes through changes in its early life of a very striking character. In outline it changes less no doubt than the shore crab, but in habits, mode of progression, food, &c., the changes are momentous. From a transparent free swimming, almost transparent, mite in the open sea, it becomes transformed into a heavy opaque bottom-living scavenger. As the length of ¾ of an inch is approached (19·5 or 20 mm.) the eyes begin to grow more rapidly and during the stages immediately subsequent are unduly prominent. This in fact is true of young marine larvæ generally. Of course young lobsters, like other developing aquatic organisms vary in rate of growth and features of colour, &c., but the foregoing brief sketch may be said to

represent the average larval life of the lobster. As in its mature adult stage so in its early days its food is varied. Minute marine plants, algae, diatoms, as well as minute crustaceans, copepods or water fleas, &c., chiefly constitute its food. Larval lobsters feed chiefly at night, hence their illimitable myriads are not readily noted by fishermen or sailors; but on bright sunny days they rise to the surface of the sea. Light has a fascination which is common to many creatures in the water.

Rare captures of larval lobsters in the sea.

Considering the countless millions scattered every season through the sea, near the lobster breeding grounds, it is astonishing that so few have been seen or captured. Specimens of some of the stages described were sent to Ottawa on three occasions only. They were captured in the Straits of Northumberland, where, during the latter portion of the summer, certain areas must be crowded with various stages. Prior to the capture of these specimens the only actual record in Canadian waters apparently is that of Dr. J. F. Whiteaves, of the Geological Survey, who twenty-five years ago captured specimens half an inch long in the months of July and August off Pictou island, N.S. The fact is that the free-swimming lobster larvæ, like other young pelagic creatures, range within one or two fathoms of the surface of the sea, not quite at the surface where the concussion of the waves would be hurtful.

EGG FERTILITY OF LOBSTERS AT DIFFERENT AGES.

Size.	Age.	Number of eggs.
8″—10″	4 years	5,000 eggs.
10″	5 "	10,000 "
12″	6-7 "	20,000 "
14″	10 "	40,000 "
16″	15 "	60 – 80,000 eggs.
18″ probably	18 "	100,000 "

A 16½″ lobster at Wood Hole Biological Station carried 85,000 eggs.

GROWTH OF LOBSTER FRY.

Molts.	Average Length.		Age.	Growth per cent.
1st Molt	$\frac{1}{8}$ in.	7.84 Millims.		
2nd "	Over $\frac{1}{8}$ in.	9.00 "		17
3rd "	$\frac{11}{25}$ in.	11. "	20 days.	20
4th "	$\frac{1}{2}$ in	12.6 "	24 "	13
5th "	$\frac{7}{12}$ in.	14. "	38 "	12½
*6th "	$\frac{2}{3}$ in	16. "		13
7th "	$\frac{3}{4}$ in.	18. "		15
8th "	$\frac{5}{6}$ in.	21. "		12½
9th "	1 in.	24. "		16
10th "	1⅛ in.	28 "		14
11th "	1⅓ in.	32. "		14
12th "	1½ in.	38. "	1 year	19

* The young lobsters at this stage seek the bottom.

(We owe to Professor Mead and Dr. Hadley and others on the scientific staff of the Fishery Commission of the State of Rhode Island most of the details here given.)

GROWTH AND AGE OF LOBSTERS.

	Length.	Age.
1	1¾ in.– 2 in.	1 year old
2	2¾ " – 4¾ "	1½ "
3	4 " – 5 "	2 "
4	4½ " – 6 "	2½ "
5	6½ " – 7 "	3 "
6	8½ "	4 "
7	10 "	5 "
8	10½ "	4½ to 5 years old.
9	11 "	6 years old.
10	12¾ " –14 in	10 "
11	16 "	12 "
12	17¼ "	17 "
13	19 " –20 in.	(19 23 lbs.) probably 20 years old.
14	22½ "	(19½ lbs.) probably 30 years old (mostly males).

WEIGHT OF LOBSTERS IN SHELL (GIVEN IN OUNCES).

Size.	Male.	*Female without eggs.
inches.	ounces.	average ounce.
6	5·33	8·75
7	10·18	10·76
7½	11·86	11·43
8	15·16	15·30
8½	16 61	16·36
9	18·96	18·61
9¼	19·91	19·32
9½	21·24	20·51
10	24·14	21·19
10½	28·89	27·52
11	34·65	30·48
11½	42·36	34·46
12	43 78	42·00

* In addition to the weight of female lobsters given above, the weight of the eggs must be added viz 2 ounces and over.

TABLE of Weights of Lobsters of various Sizes (from 5 inches long) obtained on the Northumberland Straits shore of New Brunswick in July 1913, by Richard O'Leary, Richibucto, N.B., member of the Commission.

Length.	Male.	Female.
	lbs.	lbs.
5 inches	·188	·187
5½ "	·253	·251
6 "	·313	·312
6¼ "	·313	·375
6½ "	·313	·312
6¾ "	·312	·375
7 "	·376	·377
7¼ "	·438	·437
7½ "	·502	·501
7¾ "	·437	·500
8 "	·563	·562
8¼ "	·626	·687
8½ "	·626	·751
8¾ "	·752	1·125

TABLE of Weights of Lobsters of various Sizes, &c.—*Continued.*

Length.	Male.	Female.
	lbs.	lbs.
9 inches	1·002	1·001
9¼ "	·812	·937
9½ "	1·003	1·063
9¾ "	1·252	·998
10 "	1·564	1·252
10¼ "	1·439	1·374
10½ "	1·249	1·685
10¾ "	1·626	1·502
11 "	2·248	3 001
11¼ "	1·998	2·188 (with eggs)
11½ "	2·127	2·811
11¾ "	2·627	2·750
12 "	2·562	3·375
12¼ "	2·408	3·746
12½ "	3·375	1·751
12¾ "	2·564	2·497 (with eggs)
13 "		

TABLE OF SIZES AND WEIGHTS OF FOUR LARGE LOBSTERS, JULY 5, 1913, FROM THE MUSQUASH SHORE, ST. JOHN COUNTY, N.B.

(Supplied by Professor Prince, Chairman of the Commission.)

—	—	Length.	Weight.
		ins.	lbs.
SPECIMEN 1	Rostrum to tip of tail, inclusive	15½	3⅜
	Tip of large claw to tip of tail, inclusive	23½	
SPECIMEN 2	Rostrum to tip of tail, inclusive	15¼	2⅞
	Tip of large claw to tip of tail, inclu-ive	23	
SPECIMEN 3	Rostrum to tip of tail, inclusive	15	4
	Tip of large claw to tip of tail, inclusive	23¾	
SPECIMEN 4	Rostrum to tip of tail, inclusive	14½	3½
	Tip of large claw to tip of tail, inclusive	22¼	

Three of the above were male lobsters, and one female, not carrying external egges or 'berries'. All had lost some ounces in their weight, on account of being boiled and owing to transportation.

LIFE HISTORY OF THE OYSTER SUMMARIZED.

'In studying oyster propagation, the first important fact to be noted is this, that each oyster originates in an egg of extremely minute size. This egg is like a ball, but soon assumes the form of a pyriform oval body. Each measures about one five-hundreth part of an inch in diameter, so that five hundred of these eggs in the case of our Atlantic oyster (*Ostrea virginiana,* Lister) would cover an inch if laid side by side. The English oyster (*Ostrea edulis,* L.) produces much larger eggs, no less, in fact, than one two-hundred-and-fiftieth of an inch in diameter, or more than twice the size of the oysters' eggs in our Canadian waters.

'Each egg has the character of a minute grain of soft living matter, practically invisible to the naked eye. These eggs are produced by special organs in the mature oyster at a particular period known as the breeding season, to cover which period legislative prohibitions have been enacted in all civilized countries. These special organs form a network imbedded in the fleshy body of the oyster. The network is made up of very delicate canals, with pockets or follicles at intervals, and it is in these follicles that the eggs arise. The eggs, when ripe, pass down the fine canals into a main duct on the right and left side of the oyster. These larger right and left ducts open into the fore part of a slit or depression.

'CANADIAN' ATLANTIC OYSTERS.

'(1) Sexes separate.
'(2) Unfertilized eggs shed by parent.
'(3) Eggs and sperms meet in the open sea and fertilization is accomplished.
'(4) The swimming embryo is naked and has for a time no shell.
'(5) Number of eggs enormous, probably 10 to 80 millions produced by each female oyster.

EUROPEAN OYSTER.

'(1) Sexes combined in the same individual.
'(2) Eggs never shed before fertilization.
'(3) Eggs fertilized and retained within the mother-oysters' shell.
'(4) Embryos protected by a thin shell, and emitted as "black spat."
'(5) Eggs do not exceed one or two millions, *i.e.*, ten eggs for every hundred eggs produced by the Canadian oyster.'

Oysters will spat in shallow water sooner than they will in deeper water, owing to the difference of temperature at the different depths.

They will breed long before they are full grown, very probably in the first year of their age; certainly in the second. Their productiveness appears to reach its maximum at five or six years, and afterwards to decline; but much further observation is needed before we possess certain knowledge.

The state of the weather, however, has a serious influence on the spawn, and on the adult oyster power of spawning. A cold, wet and windy season is very unfavourable, and a decidedly cold day will kill the spat, so that it will be seen that, while in the embryonic state, young oysters are very delicate and susceptable to cold. If the temperature of the sea suddenly drops many degrees, they all close their shells and fall to the bottom dead, just as a frosty night will 'nip' and cause to fall off from the branches the delicate blossoms of fruit trees. If, on the contrary, the weather continues of a warm and equable temperature both day and night, and if it be at the same time calm, the young oysters will have a chance of taking up their positions on the various substances they love best, viz., stones, gravel, empty shells, living oysters, and other clean, hard substances.

SYNOPSIS OF LIFE OF CANADIAN OYSTER.

1. The sexes are separate, and not united in the same individual as in the bermaphrodite European oyster (*Ostrea edulis*)* in which the eggs are retained in the shell and fertilized there and afterwards are ejected or 'spat' out, in an advanced condition, hence called 'spat.'

2. The ripe female oyster throws out the eggs, each 1/500th of an inch in diameter, when tht temperature of the water is about 70° F. Each egg is irregular, often elongated in shape and with a much clearer central part, the rounded nucleus. The outside of each egg forms a denser covering often called a shell or membrane. The eggs sink to the bottom when puffed out in small clouds by the spawning oyster. One oyster produces 10 to 16 million of eggs, but larger specimens produce five times the amount of eggs just stated.

3. Small young oysters in shallow water spawn earlier than larger oysters, especially if in deeper water. Northern beds are later than beds on the more southern parts of the Atlantic coast.

4. Sperms are thrown out by the male in immense numbers. Three thousand sperms are equal in bulk to a single oyster egg, hence they are very minute. Eggs and sperms meet in the open water, and the sperms cling by hundreds to each egg. Over a hundred have been observed attached to one egg, but only one sperm enters. At one end of the egg the 'shell' is very thin and protrudes like a funnel, ruptures and sucks in a spermatozoon. This opening is the micropyle, and it closes over and the egg becomes spherical in form.

* In the Portuguese oyster (*Ostrea angulata*) the sexes are separate.

5. After fertilization, as described, the egg undergoes cleavage and forms a ball of small particles or cells, and revolves round and round. This is the morula stage of the oyster germ.

6. In five hours after fertilization the germ becomes an embryo and develops a velum, a pad of moving cilia or hairs which drive it rapidly round and round in the water. Such swimming embryos abound at the surface of the sea, and are carried about by currents and subjected to endless perils, especially small animals which feed upon them. also frost, cold, storms, etc.

7. A small two-valved shell develops in four or five days, this thin horny shell having a straight valve edge, becoming pointed later. The larval oyster shows a great tendency to close its valves and drop to the bottom if disturbed. They measure not more than 1/300th inch across.

8. In about three weeks the larval oyster creeps about by means of a rudimentary foot and later permanently takes up its abode on the bottom or rather it 'sets' or attaches itself to the clean surfaces of shells and other objects, preferably selecting the dark side. It has now increased four times the length of the stage when the shell first forms. The shell, as Dr. Julius Nelson, who has made the most recent and elaborate study of the embryology of the oyster, says, is first rather scallop like, later it resembles the clam, and finally assumes an oyster shape though still recalling the clam shell. At a temperature of 70° F. the spat may set within two or three weeks and is 1/70th of an inch in diameter.

9. Having once taken up its permanent abode the only changes of practical importance are the increase in size and the arrival of sexual maturity. Like the mussel and other mollusks the oyster may contain reproductive elements when a year old. Growth is more rapid where fresh water mingles with the sea water as that is most favourable for abundance of diatoms, and lowly plants upon which oysters feed. Perfectly still water is not best. Currents and movements in the water which disturb the bottom and scatter diatoms, etc., are advantageous.

10. Subsequent growth depends upon temperature, food and other conditions. Under very favourable conditions, oysters have been found to increase at the following rate, viz., at 6 weeks, 7·5 mm. (⅓ in.); 7 weeks, 11 mm. (½ in.); 12 weeks, 30 mm. (1⅛ in.); 1 year, 2½ and 3 inches (75 mm.); 2 years, 95 mm. (3½ in.); and in the third year a size of 4 in (11 cm.) has been recorded, but under less favourable environment the growth attains only half that stated.

QUOHOG OR HARD-SHELL CLAM; ITS LIFE HISTORY.

1. *Egg.*—The eggs which are very minute are produced in the ovarian glands, and the sperms in the spermaries, these organs enlarging and becoming plump in July, sometimes earlier and sometimes later according to the early or later season. Each egg is like a little round ball when seen through a microscope. It is less than 1/300th of an inch in diameter,* while the sperms are not more than 1/500th of an inch in size with a lashing tail about twenty times longer.

2. *Spawning.*—The ripe clam puffs its eggs out like smoke into the water, often shooting the cloud of eggs a distance of 2 inches, when they scatter and come into contact with the sperms or male elements similarly scattered in the water. The time taken in pouring out spawn may be half a minute or more.

3. *Main spawning period.*—July is the main spawning time but at times hard-shell clams spawn before the end of June, and even on to August. The temperature hastens or retards the spawning, and when a temperature of 76° F. is reached spawning takes place.

4. *Age of spawning clams.*—Spawning takes place when the clam is 2 years old, and not more than 1½ inches across, but the most productive spawning size is 2½ or 3 inches. Old clams cease to spawn. If a clam is buried by shifting sand it will not spawn. It spawns when protruding from the surface, and not during daylight.

* The egg increase by the swelling of its jelly envelope to 1/100th of an inch in diameter.

5. *Floating larval clams.*—About ten or twelve hours after the eggs are thrown out, or spawned, the larva is so far developed as to swim actively about near the sea's surface. In thirty-six hours it acquires a two-valved shell. For a week or more they swim about, dropping down suddenly to the bottom if jarred or disturbed. Then each throwns out a tenacious thread or byssus ¼ or ½-inch long, and attaches to sand-grains or shells, eel-grass, etc. The byssus is an organ of the young stage only, but in the mussel it lasts through life. Young clams have been found attached as late as October, but August and September usually cover the period.

6. *Crawling stage of clam.*—When 1/12th of an inch or more long the clam begins to crawl about on the bottom. It can move 1 to 2 inches in 12 hours, as was observed by placing some in a dish of white sand.

7. *Food of clam.*—The food of the clam resembles that of the oyster, mussel and other shell-fish. It draws in nutriment which is floating in the water around, minute particles of organic and inorganic matter, especially diatoms ,and other microscopic plants, and protozoan forms. There is danger of infection when pollutions are poured near clam beds. Hard-shell clams are as dangerous as oysters in the spread of typhoid fever. Clams laid down in harbours or near drains should not be eaten. Fortunately Canadian clam beds are not near large cities but are clean and unpolluted.

8. *Adult growth.*—A clam 1/25th of an inch long has been found burrowing, and they become active and grow at such a rate, if not overcrowded, as to reach 1 1/10 inches in 18 months. In 2½ years a clam will be nearly 2 inches, and in 3½ years 2½ inches and over, and in 4½ years a length of not less than 3 inches is reached.

9. *Favourable conditions for clam beds.*—Size and rapid growth depend upon an avoidance of over-crowding; cleanliness of the flat or bed, freedom from weeds and rough stones; absence of pollutions and enemies, e.g., starfishes, boring mollusks, &c.; currents carrying food. As to over-crowding, 20 seed clams to a square foot has been found advantageous, scattered by means of a shovel from a boat.

10. *Method of fishing beds.*—Alternate areas should be fished; thus if four areas are buoyed or marked, and these fished in rotation in successive seasons, each area will have three seasons growth before being again fished. Three bushels a day for each man should be the maximum allowed, and that is not excessive on a cultivated bed.

11. *Profits from culture.*—If seed clams be planted out, and given space to grow and get enough food, profits are substantial and assured. If 120 bushels of clams 1¼ inches in size be planted on an acre, the total cost at United States rates would not exceed $600, but by the time they reach 2½ inches they would bring $1,800, each bushel increasing threefold.

12. *Spat collection.*—It may be added that, if ridges of gravel and sand be made that will catch the drift of the local currents, the floating spat can be caught and prevented from being lost.

13. *Later growth of clam.*—Observations carried on upon the growth of the clam have shown that as the shell-fish increases in age it does not continue to grow proportionately. Thus while a clam 6 months old and measuring ¼th of an inch will reach in 2½ years a size of 2 inches, it will only reach 3 inches in 4½ years and in 7½ years will not exceed 3½ inches. One authority vouches for the fact that in 16 years a clam will only measure 4 inches, but while showing such slow growth when advanced in age it may continue to grow in thickness of shell. The shell in 'bull' clams is often very dense and heavy.

SOFT-SHELL CLAM OR SAND CLAM *(Mya arenaria).*

1. *Spawning time.*—The soft-shell clam spawns in May, June and July, and pours its eggs out into the water where they meet the male sperms and are thus fertilized.

2. *Swimming larva.*—Like the oyster, hard-shell clam and other shell-fish, the young sand clam drops to the bottom, and in a few hours develops locomotor organs called cilia which carry it rapidly through the water. At the early swimming stage it is very difficult to distinguish it from the other shell-fish larvæ mentioned, but there are microscopic differences.

3. *Clinging stage.*—During the first week or ten days it acquires a transparent shell, and develops a byssus or thread of attachment. Like the hard-shell species it clings to stones, eel-grass, &c., but by the time it reaches a length of ⅛ of an inch it burrows and by means of its muscular tongue-like foot moves about on the bottom. Clam flats should be firm, for if too muddy and shifting, vast numbers of young suffocate and perish, indeed shifting bottom is fatal to adult clams. Eel-grass is not favourable as it has a tendency to collect slimy deposits, fine silt and the like.

4. *Growth of the young clam.*—In one or two weeks the clam is 1/20 of an inch across, but if the season be favourable it will grow to a size of ¼ an inch in six or seven weeks. Five or six weeks later, i.e., by the middle of August, it is an inch long. Dr. Kellog found clams to increase in size from 1 inch on July 13, 1899, to a size of 2½ inches by July 4, 1900, a growth in nearly twelve months of close on 700 per cent in bulk.

5. *Favourable conditions.*—If not overcrowded, and with abundant food, absence of eel-grass and active enemies, and of pollutions, soft-shell clams become of marketable size in two years.

6. *Food of soft-shell clam.*—Diatoms, minute plants and infusorians form the food of the clam, and on clean shallow flats such food abounds.

7. *Clam culture.*—It is found that good results may be relied upon if say 500 bushels of seed clams are spread over an acre of suitable shore flat. Clams must not be exposed to sun (summer heat) and uncovered by water, as in one or two days they are killed.

SCALLOP OR PECTEN.

1. There is no doubt that numerous beds of scallops occur along the shores of the maritime provinces, of which only a small proportion have been discovered and even these have been little utilized. The scallop, of both species occurring in Canada, frequents greater depths than those which the clams favour generally.

2. *Breeding.*—The sexes are separate in the scallop, and the eggs and sperms are thrown out by the respective breeding individuals and they mingle and effect fertilization in the water. At a temperature of 68° to 84° F. they have been observed to spawn, but 76° F. is the most favourable.* Several million eggs are produced by each female scallop, and as many as 1,600 sperms have been noticed clinging to one egg.

3. *Larval scallop.*—The egg develops in a few hours into an active swimming embryo, which is so small as to be barely visible to the naked eye. In two weeks it descends to the bottom and throws out a sticky byssus or thread, and thus clings to eel-grass, stones, &c. They have been found to cling to frayed rope, but it is not easy to devise a successful spat collector for this shell-fish.

4. *Free stage.*—After the permanent though still very small shell is complete, the scallop cuts himself loose, and exhibits a wonderful swimming power, rapidly opening and shutting the two valves of its shell. Scallops have been said to swim at one continued effort 25 feet, but 10 feet is a more usual maximum voyage.

5. *Short adult life.*—A one-year old scallop will reproduce, and in the second year most scallops die. They are therefore of rapid growth and mature much more quickly than other marketable shell-fish.

6. *Food.*—The scallop feeds on diatoms and similar floating nutriment as that upon which the clams live.

* This observation was made on the Rhode Island shores by Dr. Vinal.

7. *Culture of scallops.*—The artificial culture of scallops is less easy than other edible mollusks, partly because the best kinds live at some depth, they are killed if in too shallow water, being very sensitive to frost and cold, and the spat cannot be easily secured by collectors.

Canadian Scallop Fishing.

As scallops usually occur in fairly deep inshore areas the customary mode of taking them is by means of a drag or dredge, often used in 25 fathoms of water. The dredge is three feet across, and the attached bag is of 3½-inch mesh, and four feet deep or long. In a day's fishing on suitable sandy bottom 2,500 scallops may be taken, but about half or say 900 or 1,000 must be thrown away. A 2-inch scallop is considered small and a 6-inch scallop is a large one. All less than 3 inches in size are thrown away. Only the 'white cord' or large adductor muscle, which draws the two valves of the shell together is used, and it takes probably 20 to 25 scallops to make one pound of meat. Where they are canned as at Tancook, Lunenburg county, N.S., probably 20,000 dozens of scallops are used each season to make the 300 or 400 cases put up there. Clams taken in deeper water are superior in quality to those dredged in more shallow areas.

'PERIWINKLE.'

Amongst the shell-fish which are very abundant on our Canadian shores, the periwinkle deserves some mention. It is practically not used at all for food by the people, but there is an immense demand for this dainty little mollusk in the United States and especially in London, England.

It is so easily gathered by hand on the rocks at low water that quite an industry could be created were the fishermen to employ the younger members of their families in collecting these, so that they might be shipped away in large quantities to points for export.

We are of the opinion that there is a possible future industry in the periwinkles which abound on our rocky shores everywhere, but we have no recommendations to make in regard thereto, either with respect to a size limit or season as in the early stages of a periwinkle fishery, only the larger specimens would probably be gathered and shipped away in sacks.

MUSSELS.

Mussels have a widespread distribution and occur in great abundance all along the Atlantic shores, but are not utilized for food, and are very little used for bait by the inshore fishermen. As they are a splendid bait for haddock and cod, and as is well known form in Scotland a most important bait, as they do also in other European countries, we would urge that our mussel resources be given more attention by our fishermen. We believe them to be capable of great development.

DECLINE OF THE CANADIAN SHELL-FISH RESOURCES.

Respecting the general condition of the shell-fish fisheries, the evidence indicates beyond dispute that they have declined, with the exception of the clam industry which is a commercial enterprise of comparatively recent development, and has shown a decline in a few localities only, so that we regard it as very necessary that protective steps should be taken in good time before permanent injury has been done to these valuable fisheries.

Twenty years ago the clam industry averaged annually about $15,000 or $16,000 in value, and the oyster industry was valued at from $180,000 to $190,000. The returns for last year (1911-12) show that the oyster yield was valued at a little over $212,000, whereas the yield of clams was over $332,000. Thus this new industry now

considerably exceeds the old-established industry in value and productiveness. The lobster and oyster fisheries, though still important and productive, do not compare in actual productiveness with the condition twenty or thirty years ago. Of course we recognize that there are fluctuations, and lobsters have sometimes appeared to be on the verge of extermination, as in 1879, when an important packer stated that lobsters had become scarce all along the coast of Nova Scotia, nearly every factory being closed, or about to close, having taken nothing. He added: 'I fear we have already exhausted this valuable fishery.' But the general decline to which we refer cannot be explained by such temporary fluctuations, and there has been a great scarcity of lobsters over a long period of years in spite of the vast increase in the amount of gear used and the greatly increased efforts to capture lobsters and to keep up the pack.

TABLE showing the Aggregate Quantities of Oysters caught in the Dominion since 1876, compiled from Annual Reports of the Department of Fisheries.

Year.	New Brunswick.	Prince Edward Island.	Nova Scotia.	Totals.
	Quantity.	Quantity.	Quantity.	Quantity.
	Brls.	Brls.	Brls.	Brls.
1876	7,911	7,905	1,040	16,856
1877	7,738	20,850	980	29,568
1878	11,270	17,902	912	30,090
1879	9,420	18,145	1,067	28,632
1880	12,280	20,297	1,861	34,438
1881	8,413	20,815	2,270	31,498
1882	5,859	57,042	1,745	64,646
1883	10,317	38,880	1,343	50,540
1884	11,851	28,290	1,595	41,736
1885	27,368	28,204	1,310	56,882
1886	28,083	33,125	1,397	62,605
1887	23,196	36,448	1,716	61,360
1888	16,384	35,861	1,589	53,834
1889	17,760	41,257	2,532	61,549
1890	16,710	35,203	3,013	54,926
1891	14,934	41,030	4,318	60,282
1892	17,840	32,937	3,776	54,553
1893	16,365	29,627	3,488	49,480
1894	19,960	24,055	2,512	45,527
1895	18,070	25,463	2,540	46,073
1896	14,700	30,214	2,400	47,374
1897	19,835	20,915	2,372	43,122
1898	22,675	26,484	2,097	51,256
1899	17,250	18,236	2,027	37,513
1900	19,240	17,825	1,855	38,920
1901	14,460	24,972	1,690	41,122
1902	12,719	20,334	1,663	34,716
1903	17,470	18,333	1,354	32,157
1904	15,320	18,006	1,411	34,737
1905	14,300	17,656	1,466	33,422
1906	14,920	14,988	1,722	31,630
1907–08	15,435	1,672	1,337	26,444
1908–09	19,080	11,472	1,515	32,067
1909–10	19,340	13,519	1,716	34,575
1910–11	14,045	11,264	1,696	27,005
1911–12	15,436	8,835	2,090	26,361

VALUE of Clam Fishery in Maritime Provinces (At 10-Year intervals), 1881 to 1911.

New Brunswick.	Nova Scotia.	Prince Edward Island.
$	$	$
1881.		
None	935	None.
1891.		
None	None	None.
1901.		
68,610	5,754	560.
1911.		
265,208	32,257	61,109.

In the above returns clams taken for bait by fishermen are not included.

VALUE of Production of Clams (Hard-shell and Soft-shell), 1912.

—	New Brunswick.	Nova Scotia.	Prince Edward Island.	Quebec.
	$	$	$	$
Clams canned	81,320	28	2,040	None.
Clams and quahogs used fresh	114,422	57,901	30,332	5,155

NECESSARY FEATURES IN EFFECTIVE LOBSTER LAWS.

If it be admittel, as few will dispute, that laws are necessary to preserve permanently as a profitable industry the lobster fishery, it should be borne in mind that such laws should as far as possible fulfil the following conditions:—

1. The interests of those engaged in the industry must be fully provided for. No established interest should be ruthlessly injured, and the fisherman should have his livelihood ensured and vested capital should have its interests fairly considered.

2. The interest of the whole country must not be allowed to suffer or a great national resource be destroyed in the interest of a section only of the community. The shell-fish resources are the possession of all the nation, whether living on the coast or inland.

3. The object should be to maintain and increase the supply of lobsters, without ignoring the legitimate demands of the markets. Foreign markets must not, however, over-rule the interests of the fishing population or the country as a whole.

4. Provisions *re* seasons, size limits, price, &c., must be framed so as to comply reasonably with the commercial side of the industry.

5. The regulations should be such as to admit of equitable and rapid and inexpensive enforcement, so that they shall not be burdensome or unworkable and useless.

6. The seasons should be such as to avoid the taking of soft-shell and unseasonable lobsters as well as berried lobsters. Soft-shell lobsters occur plentifully at certain times of the year, as fishermen and packers recognize.

We found in different localities a difference of opinion amongst the fishermen as to the best mode of securing the preservation of the seed lobster. We could not fail to note a very general feeling amongst the fishermen that they would be willing to preserve the seed lobster providing their neighbours were strictly compelled to observe the same condition. Others, again, claimed that if they were compensated for liberating seed lobsters that would be an effective method of securing that end.

LOBSTER CLOSE SEASON.

In our tour we found without exception the fishermen and all interested in the lobster industry were a unit on the matter of the necessity of a close season. They were unanimous in their view that the policy adopted in the United States, namely, the non-enforcement of a close season to protect the spawning lobsters would be disastrous to the lobster supply. We found in every locality that a close season is strongly favoured, and the only difficulty arises from the variety of opinion as to the best period to define in the various localities to protect the spawning lobsters. In most districts a long close season with a short open season, as short as would be consistent with the profitable pursuit of the lobster industry, and in other areas the adoption of two open seasons, one in the spring and one in the fall, was urged upon the commission.

One universal lobster close season would of course be most effective. It would then be impossible for any fishermen to have gear in the water, or for freshly-caught lobsters to be handled or shipped, or even for canneries to operate without immediate detection. But failing a single close season applicable to the whole of our Atlantic shore, a division into two large areas, each with its own close season, would of course present many advantages. An area north of Canso in western Nova Scotia, and one south and west of Canso, would form such two areas. In the latter area, the live lobster business being prominent would necessitate a different close season from the waters north of Canso, where practically the industry is confined to that of canning.

An analysis of the evidence we have received strongly indicates that such a division into two large areas would act very unfairly in certain localities, and indeed might close out the local fishermen altogether in such localities. But the existing system of eight or ten different close seasons in as many localities has introduced a good deal of laxity in the observation of the close seasons, and has, it must be admitted, tended to demoralize the whole industry. Instances have come to the notice of the commission where lobster packers continued to pack long after the close season in their locality had commenced because they were able to obtain lobsters in an adjacent area in which the close season was different. The smacking of lobsters, or the shipping of them from one area to another, has grown up in recent years to such an extent that canneries do not now depend on the lobsters in their immediate locality, and this is a feature which should be given careful consideration, and we make some suggestions in another part of this report with a view to meeting this new state of things.

In order to make the close seasons in any way effective, we have felt bound to consider the special conditions existing, and we have therefore recommended a series of five close seasons which are set forth in our recommendations. There is much to be said in favour of a spring and fall open season, for the reason that in the spring the lobsters are in good condition and have not yet spawned, while in the fall they have got through spawning and have recovered their condition, and indeed it is claimed that in September and October lobsters are in the finest possible state for the market. Between the spring and the fall there is no doubt that the main spawning time of the lobster occurs, and the pursuit of the industry during the summer months renders it impossible to avoid catching lobsters which are carrying eggs and are just about to hatch them out. To cut out summer fishing would have utterly prevented any fishing at all being carried on over a very large extent of our Atlantic coast, and stormy weather at other seasons of the year would prevent the setting of gear and continuous fishing in most localities. Hence the close seasons we recommend, with the provisions as to the preservation of seed or spawning lobsters and their regulation, should, we think, ensure the prosperity of the lobster supply in the future.

NO EXTENSION OF SEASON (LOBSTER).

There was entire unanimity as to the undesirability of the extensions which have from time to time been granted by the department at the close of the lobster fishing season, and the extra days allowed at the commencement and at the close for setting out or taking up traps and gear. In some seasons bad weather has been urged as the cause why gear was not out of the water at the conclusion of the season; but as a matter of fact the allowance of some days at the beginning or at the end of the season has led to much illegal fishing and to considerable demoralization of the industry. Indeed, in one locality at any rate, namely, in the waters around Seal Island, traps have been purposely left in the water in order that lobster fishermen from the United States might make use of them after the Canadian law forbade the setting of any more gear. There is indeed a systematic effort year after year to enable United States poachers to fish just outside the territorial limits or even within these limits, and with the connivance of a small section of fishermen to carry on illegal operations to the injury of our fishery, and to the detriment of the fishermen themselves generally.

As commissioners we have come to the conclusion that dates should be specified for the commencement and closing of lobster fishing, and that on or before those dates, and after the expiry of such dates, no gear should be left in the water. We are of opinion that the fishery officers should be very strictly instructed to seize all such gear, and to allow of no excuse on the part of the owner. It is unfair to the law-abiding fishermen, who strictly observe the regulations, to permit this gear to remain

in the water; and as there is every evidence of over-fishing being the cause of the decline of the lobster supply, any limits, including days allowed for taking in gear, should be rigidly enforced.

CLOSING OF LOBSTER CANNERIES AT END OF SEASON.

We are strongly of opinion that it would materially assist in the stricter observance of the regulations regarding the close season if every cannery were by law compelled to cease canning operations within three days of the specified legal open season. This, in our opinion, allows plenty of time in which to bring the traps and gear ashore. This regulation closing down each cannery within the limit stated would ensure two important objects: First, it would enable each packer to complete the canning of the lobsters found in the traps when the gear is being brought ashore; second, it would facilitate the observance of the regulation specifying the closing of fishing operations.

AMOUNT OF TRAPS TO BOATS AND CANNERIES.

It is generally admitted that the amount of lobster traps set year after year is excessive, and there is a tendency all the time to increase the amount of gear and to push the fishing to excess. The increasing use of motor boats has intensified this considerably. Men can handle more gear now than formerly, and not only so but there is considerable smacking of lobsters or carrying them from one area to another, a feature which tends to still further increase overfishing. When the fishermen and canners in a certain locality relied upon the lobsters in that locality for the success of their operations they were more likely to encourage efforts to preserve the lobster supply in that locality, but the smacking of lobsters, or carrying lobsters from one area to another so that the cannery in one locality can rely on lobsters obtained from a distant locality has certainly tended to make the fishermen and canners indifferent to the welfare of their local supplies of lobsters.

It has been suggested that a limit on the number of traps should be specified for each boat, the maximum number being 300 traps, while again it has been suggested that the number of boats allowed to each factory should be limited by law, and eight or ten boats, including both boats owned independently and owned by the factory owners, should be the maximum limit. We are convinced, however, that no such limitation to the number of traps or to the number of boats would work satisfactorily, and we would rather rely for the preservation of the lobster upon other measures, such as a short open season, the preservation of the berried lobsters, and the prohibition of short or immature lobsters.

The productiveness of our lobster fishing grounds is amazing, and the fact that the annual catch far surpasses that of any other country demonstrates that the Atlantic shores of Canada are an ideal resort and breeding ground for this valuable shellfish. The number of individual lobsters taken year by year has been estimated and the table given below is very surprising. It may be regarded as a fairly reliable estimate, and it shows the quantity taken in Canada at the present time as compared with the number of lobsters taken in the other countries named.

COMPARATIVE QUANTITIES (BY NUMBER) OF LOBSTERS TAKEN ANNUALLY IN THE COUNTRIES NAMED.

(Based on the 'Bulletin Statistique des Peches Maritimes,' Vol. 6, 1909, Cons. Perm. Internat. pour l'Explor. de la Mer.)

Canada	70,000,000 to 90,000,000 lobsters.
Newfoundland	6,000,000 lobsters.
Ireland	1,264,000 "
Scotland	712,000 "
England	546,800 "
Norway	1,249,000 "
Sweden	612,680 "
France	605,000 "
Denmark	28,500 "
Netherlands	7,456 "
Germany	7,000 "
United States	10,000,000 "

The returns from France include the 'Langouste,' or crawfish of the sea (*Palinurus*), as well as the true lobster (*Homarus*).

VALUE of Lobster Fishery Production in Canada at Ten Year Intervals, 1881-1911.

—	Nova Scotia.	New Brunswick.	P. E. I.	Quebec.
1881.	$	$	$	$
Lobsters, canned	734,353	813,157	1,262,573	129,137
" fresh	1,400	None.	None.	None.
	735,753	813,157	1,262,573	129,137
1891.				
Canned	885,306	466,216	513,857	
Fresh	215,620	36,880	None.	
	1,100,926	503,096	513,857	
1901.				
Canned	1,000,604	368,468	477,214	
Fresh	1,113,485	120,566	160	
	2,114,089	489,034	477,374	
1911.				
Canned	1,168,826	471,012	640,619	281,300
Fresh	1,103,057	112,610	1,400	5,275
	2,271,883	583,622	642,019	286,575

Number of lobster canneries and traps (by Provinces), 1897-1911.

Year.	Nova Scotia.		New Brunswick.		Prince Edward Island.		Quebec.		Total.	
	Canneries.	Traps.	Canneries.	Traps.	Canneries.	Traps.	Canneries.	Traps.	Canneries.	Traps.
1897.....	218	602,612	201	220,912	220	216,133	99	116,695	738	1,156,352
1898.....	231	645,167	199	243,719	230	284,285	154	162,470	814	1,335,641
1899.....	247	681,183	216	241,002	240	283,114	155	159,345	858	1,364,644
1900.....	277	698,932	237	246,861	246	302,117	159	134,985	919	1,382,935
1901.....	258	702,292	221	251,620	225	280,880	151	128,720	855	1,363,512
1902.....	240	657,531	198	229,739	192	241,896	93	92,070	723	1,221,236
1903.....	242	625,052	199	240,449	190	253,195	83	86,310	714	1,205,006
1904.....	237	643,552	206	256,550	199	295,975	91	92,920	733	1,288,997
1905.....	237	591,770	198	269,276	196	283,960	92	94,645	723	1,239,651
1906.....	238	600,125	197	266,161	188	312,945	78	89,635	701	1,268,866
1907.....	217	636,400	184	289,951	184	305,970	96	108,390	681	1,340,711
1908.....	215	705,600	187	311,815	183	350,319	90	109,889	675	1,477,623
1909.....	217	692,465	189	312,895	187	350,505	84	102,720	677	1,458,585
1910.....	214	720,577	185	315,740	187	359,870	96	108,685	682	1,504,872
1911.....	226	756,067	200	253,400	185	339,340	96	120,385	707	1,469,192

Number of Lobster Canneries and Traps (by Counties).

A. BAY OF FUNDY.

Year.	St. John.		Annapolis.		Kings.		Total.	
	Canneries.	Traps.	Canneries.	Traps.	Canneries.	Traps.	Canneries.	Traps.
1897		10,990		7,025				18,825
1898		10,700		6,500				17,200
1899		13,200		3,550				16,750
1900		10,000	2	2,900			2	17,900
1901		10,000		4,525		947		15,472
1902		5,250		9,100		991		15,341
1903		5,090		7,800		1,064		13,954
1904		5,050		5,500		1,192		11,742
1905		[1]9,650				1,252		20,902
1906		[2]5,425		9,400		1,722		16,547
1907		[3]4,905		11,755		1,875		18,535
1908		[4]5,400		12,950		1,785		20,135

[1] 200 in Albert Co. [2] 300 in Albert Co. [3] 300 in Albert Co. [4] 500 in Albert Co.

B. DIGBY AND CHARLOTTE.

Year.	Digby.		Charlotte.		Total.	
	Canneries.	Traps.	Canneries.	Traps.	Canneries.	Traps.
1897	4	24,700	7	24,192	11	48,892
1898	7	31,110	8	23,059	15	54,169
1899	11	28,885	7	17,702	18	46,587
1900	9	30,274	12	19,461	21	49,735
1901	8	35,111	7	20,620	15	55,731
1902	11	29,120	9	18,189	20	47,309
1903	10	34,376	5	17,179	15	51,555
1904	10	34,029	4	18,900	14	52,929
1905	11	35,470	4	6,476	15	41,946
1906	12	35,210	4	18,586	16	53,796
1907	15	34,105	4	19,746	19	53,851
1908	16	36,548	4	19,615	20	56,163

C. EAST COAST, NEW BRUNSWICK.

Year.	Restigouche.		Gloucester.		Northumberland.		Kent.		Westmoreland.		Total.	
	Canneries.	Traps.	Canneries.	Traps.	Canneries.	Traps.	Canneries.	Traps.	Canneries.	Traps.	Canneries.	Traps.
1897....	1	2,260	59	76,860	9	12,200	55	48,400	70	46,100	194	185,820
1898....	2	3,260	60	80,700	12	13,000	56	55,000	61	58,000	191	209,960
1899....	2	3,500	64	82,300	13	14,000	58	48,500	72	61,800	209	210,100
1900....	2	4,100	67	85,300	16	15,300	55	52,700	85	60,000	225	217,400
1901 ...	2	4,200	67	89,400	14	14,500	57	54,900	74	58,000	214	221,000
1902....	2	4,200	64	91,400	14	14,700	35	37,000	74	59,000	189	206,300
1903 ...	2	4,680	61	94,000	13	15,000	40	38,000	78	66,500	194	218,180
1904 ...	3	5,100	63	101,000	13	15,000	44	43,500	79	68,000	202	232,600
1905...	3	6,650	65	105,000	12	15,000	46	41,500	68	75,000	194	243,150
1906...	3	5,650	67	101,800	12	16,500	45	39,000	66	79,290	193	242,150
1907....	2	5,100	69	113,500	12	17,000	39	34,700	58	95,000	180	265,300
1908....	2	6,600	70	111,500	11	18,500	41	54,500	59	95,700	183	286,800

D. PRINCE EDWARD ISLAND.

Year.	Kings.		Queens.		Prince.		Total.	
	Canneries.	Traps.	Canneries.	Traps.	Canneries.	Traps.	Canneries.	Traps.
1897	50	75,880	63	49,800	107	90,453	220	216,133
1898	52	96,500	60	59,290	118	128,495	230	284,285
1899	55	90,680	67	67,000	118	125,434	240	283,114
1900	55	87,595	63	77,550	128	136,972	246	302,117
1901	54	95,310	62	72,500	109	113,070	225	280,880
1902	51	98,576	51	54,930	90	88,390	192	241,896
1903	53	101,775	51	57,680	86	93,740	190	253,195
1904	54	117,675	53	74,240	92	104,660	199	295,975
1905	52	111,050	55	78,880	89	94,030	196	283,960
1906	52	122,900	52	74,825	84	115,220	188	312,945
1907	49	118,500	51	64,500	84	122,970	184	305,970
1908	50	139,000	51	83,960	82	136,339	183	350,319

E. EAST COAST CAPE BRETON.

Year.	Cape Breton.		Victoria.		Total.	
	Canneries.	Traps.	Canneries.	Traps.	Canneries.	Traps.
1897	16	42,400	20	26,215	36	68,615
1898	14	43,700	18	18,175	32	61,875
1899	15	61,199	17	13,699	32	74,898
1900	13	46,361	20	13,217	33	59,568
1901	18	38,270	17	13,983	35	52,253
1902	12	39,050	12	15,550	24	54,600
1903	14	31,588	18	14,553	32	46,141
1904	12	29,890	17	14,256	29	44,146
1905	11	39,200	18	14,064	29	53,264
1906	15	33,360	14	16,553	29	49,913
1907	12	32,365	11	13,886	23	46,251
1908	12	31,686	10	14,224	22	45,910

F. STRAIT EAST OF NOVA SCOTIA AND CAPE BRETON.

Year.	Cumberland.		Colchester.		Pictou.		Antigonish.		Inverness.		Total.	
	Canneries.	Traps.	Canneries.	Traps.	Canneries.	Traps.	Canneries.	Traps.	Canneries.	Traps.	Canneries.	Traps.
1897	24	31,500	1	1,200	26	44,550	5	16,100	20	49,960	76	143,310
1898	28	39,450	1	1,200	25	46,415	6	22,150	24	54,000	84	163,215
1899	31	45,265	1	1,500	28	43,175	6	26,160	27	55,000	93	171,100
1900	37	46,630	4	4,600	26	47,700	6	20,800	27	49,305	100	169,035
1901	38	47,250	3	4,400	27	49,480	6	19,250	20	41,100	94	161,480
1902	36	54,390	3	4,400	25	47,660	6	17,400	20	41,450	90	165,300
1903	37	49,250	3	4,000	21	43,700	6	16,800	19	37,320	86	151,070
1904	40	52,295	2	4,000	22	44,429	6	21,300	18	40,400	88	162,424
1905	37	48,500	2	3,000	23	54,959	6	21,150	18	47,400	86	175,009
1906	32	47,120	2	4,000	23	59,800	6	18,400	20	55,400	83	184,720
1907	31	47,804	2	4,300	23	61,550	6	18,060	18	47,900	80	179,614
1908	31	54,330	2	4,400	21	64,675	6	21,847	17	47,950	77	193,202

G. SOUTHWESTERN NOVA SCOTIA.

Year.	Lunenburg.		Queens.		Shelburne.		Yarmouth.		Total.	
	Canneries.	Traps.	Canneries.	Traps.	Canneries.	Traps.	Canneries.	Traps.	Canneries.	Traps.
1897	7	14,230	8	12,478	9	82,085	9	30,250	33	139,043
1898	7	14,850	10	12,767	11	101,620	9	30,250	37	159,487
1899	6	12,000	13	12,700	12	101,320	11	23,150	42	149,170
1900	7	13,200	11	11,080	24	108,210	17	32,500	59	164,990
1901	6	15,220	7	15,231	25	109,200	22	37,200	60	176,851
1902	6	15,295	9	17,085	23	112,500	20	38,035	58	182,915
1903	6	16,910	9	19,345	21	109,400	19	40,810	55	186,465
1904	6	20,220	9	18,900	21	113,450	14	40,848	50	193,418
1905	5	20,870	9	19,000	21	42,700	15	40,855	50	123,425
1906	6	15,030	9	15,800	19	52,600	12	44,930	46	128,360
1907	7	19,000	8	17,800	16	74,500	14	45,180	45	156,480
1908	7	18,650	6	22,600	15	93,000	14	47,000	42	181,250

H. SOUTHEASTERN COAST NOVA SCOTIA AND CAPE BRETON.

Year.	Halifax.		Guysboro.		Richmond.		Total.	
	Canneries.	Traps.	Canneries.	Traps.	Canneries.	Traps.	Canneries.	Traps.
1897	24	64,675	30	85,800	15	68,544	69	219,019
1898	22	64,210	34	118,100	15	40,670	71	222,980
1899	20	62,680	34	111,850	15	79,050	69	253,580
1900	22	89,650	32	125,575	20	51,980	74	267,205
1901	21	80,630	28	117,600	12	72,895	61	271,125
1902	20	76,625	27	97,800	10	41,080	57	215,505
1903	20	70,786	28	88,900	11	38,450	59	198,136
1904	20	77,783	29	85,160	11	39,900	60	202,843
1905	21	79,000	29	88,100	11	36,250	61	203,350
1906	19	74,050	38	70,700	11	46,050	68	190,800
1907	20	85,620	25	88,600	9	32,100	54	206,320
1908	20	91,140	27	102,100	11	40,715	58	233,955

RECAPITULATION.

Number of lobster canneries and traps.

Year.	Nova Scotia.		New Brunswick.		Prince Edward Island.		Quebec.		Total.	
	Canneries.	Traps.	Canneries.	Traps.	Canneries.	Traps.	Canneries.	Traps.	Canneries.	Traps.
1897.....	218	602,612	201	220,912	220	216,133	99	116,695	738	1,156,352
1898.....	231	645,167	199	243,719	230	284,285	154	162,470	814	1,335,641
1899.....	247	681,183	216	241,002	240	283,114	155	159,345	858	1,364,644
1900.....	277	698,972	237	246,861	246	302,117	159	134,985	919	1,382,935
1901.....	258	702,292	221	251,620	225	280,880	151	128,720	855	1,363,512
1902.....	240	657,531	198	229,739	192	241,896	93	92,070	723	1,221,236
1903.....	242	625,052	199	240,449	199	253,195	83	86,310	714	1,205,006
1904.....	237	643,552	206	256,550	199	295,975	91	92,920	733	1,288,997
1905.....	237	591,770	198	269,276	196	283,960	92	94,645	723	1,239,651
1906.....	238	600,125	197	266,161	188	312,945	78	89,635	701	1,268,866
1907.....	217	636,400	184	289,951	184	305,970	96	108,390	681	1,340,711
1908.....	215	705,600	187	311,815	183	350,319	90	109,889	675	1,477,623

RECAPITULATION.

Lobsters canned and in the shell.

Year.	Nova Scotia.		New Brunswick.		Prince Edward Island.		Quebec.		Total.	
	1 lb. cans.	cwt. in shell.	1 lb. cans.	cwt. in shell.	1 lb. cans.	cwt. in shell.	1 lb. cans.	cwt. in shell.	1 lb. cans.	cwt. in shell.
1897.....	5,214,266	229,682	2,413,404	22,055	2,466,682	.....	1,036,202	94	11,130,554	251,831
1898.....	5,210,294	326,313	2,113,222	21,776	2,340,020	74	1,067,058	201	10,730,594	348,364
1899.....	4,837,402	134,462	2,177,106	19,965	3,421,144	46	1,059,658	125	10,495,310	154,598
1900.....	5,263,780	169,196	2,038,692	19,729	2,223,712	135	1,002,106	80	10,548,290	189,140
1901.....	5,003,023	146,488	1,842,340	17,605	2,386,070	32	825,171	70	10,056,604	164,195
1902.....	4,537,204	120,902	1,965,296	20,853	2,039,603	224	708,018	55	9,350,121	142,034
1903.....	5,153,712	88,586	2,136,672	17,545	2,335,400	400	978,434	108	10,604,218	106,639
1904.....	5,357,454	95,513	2,055,100	16,882	2,501,100	1,533	848,634	120	10,762,288	111,048
1905.....	4,917,148	134,871	2,249,440	18,520	2,182,624	350	1,148,412	183	10,497,624	153,924
1906.....	4,595,816	87,956	2,420,860	12,889	2,289,288	440	798,800	85	10,104,764	101,370
1907.....	4,270,326	84,279	2,731,012	12,401	2,839,489	720	819,723	90	10,660,550	97,490
1908.....	4,399,610	87,321	2,716,968	10,317	3,098,444	530	696,476	205	10,911,498	98,373

TIDAL ENCLOSURES FOR IMPOUNDING LOBSTERS.

Quite a number of witnesses urged the establishment at a number of points along the coast of sea water enclosures, especially in sheltered coves and rocky basins, which with a comparatively small expenditure could be walled in and provided with gates and made suitable for impounding lobsters. Spawn lobsters, it was urged, might be obtained from the fishermen, and placed in such enclosures until the open season was over and the fishing operations ended, and under the Department's superintendence such impounded lobsters would be replaced in the sea and thus carry out their method of natural spawning.

The idea of some fishermen that the spawn lobsters could be retained for a long period in inshore ponds, and could hatch out their young in such enclosures, is based upon a misconception as to the conditions under which lobsters naturally hatch out their eggs. The young lobsters, though hatched out in comparatiely shallow water close inshore, swim away from the shallow water into deeper water assisted by currents and tidal movements, so that the great schools of newly-hatched lobsters are never found close inshore. Several reasons can be adduced to show that nature thus provides for the safety of the young lobster by making it a pelagic, or deep-water animal. The minute oceanic animalculæ, which are collectively called ' Plankton,' form the food of the young lobster. These small organisms, almost invisible to the naked eye, abound in the surface waters of the open sea; and, in order to procure a suitable food, the young lobster on hatching out leaves the shallow inshore waters and makes at once for the waters outside, a considerable distance from shore. Being an actively free swimming animal, quite unlike the adult lobster, the young lobster for the first six weeks of its life swims near the surface of the sea within a fathom or two, and thus benefits by the large amount of sunlight necessary for its growth, as well as by the abundant food in those surface strata of the water. Out in the open sea the schools of young lobsters escape the myriads of small inshore fish which are of a predaceous character. Were young lobsters kept in inshore ponds, they would not only starve on account of lack of suitable food, but they would be devoured in immense quantities by the small predaceous fish which abound off the rocks and in coves and around the shore, but which do not occur in the waters further out. Of course, young lobsters form the food of many important fishes, and there is no doubt that mackerel, herring, &c., devour large quantities of larval lobsters floating near the surface of the sea. Nature intended that young lobsters, crabs and other crustaceans should form the food of quite a number of what are called pelagic fishes, that is, fishes that school near the surface of the sea, and it is impossible to get over this law of nature that marine animals war upon each other. It is generally held that young lobsters cannot be enclosed in confined spaces, and unless they were scattered out in the open sea they would very extensively destroy each other, and that is considered to be the great danger where young lobsters are kept in confined areas unless some mechanical method of keeping them continually in motion is adopted, as has been found successful at the Wickford lobster hatching institution in Rhode Island, U.S.A.

Another difficulty in regard to the government purchasing seed lobsters and putting them in inshore ponds is that it would be an extremely expensive method. The lobster fishermen generally take the view that they should be paid a fair price for their seed lobsters if used for such a purpose. Now, it is estimated that the number of seed lobsters which would be taken each year from the fishermen, were the system of lobster ponds adopted, all along the shores, would mean a considerable expenditure. This would certainly cause complaint amongst other classes of fishermen, and they would justifiably urge that the government could not fairly compensate a section of the fishermen in the effort to preserve their own industry at the expense of the other fishermen and the country generally. Other classes of fishermen would consider themselves quite as much entitled to be compensated for preserving the breeding fish upon which the future of their industry depends.

It is not necessary to add that the payment for seed lobsters would be a very complicated and cumbersome work involving considerable labour by the officials of the Department of Marine and Fisheries, and whatever methods of marking seed lobsters which had been paid for were adopted would certainly lead to abuse, and fishermen would be paid over and over again for the same lobster. A similar objection obtains against the payment to fishermen for lobsters liberated in the sea, and the commissioners are bound to report that in their opinion the fishermen should be prepared to make some little sacrifice in order to keep up their important industry by saving the seed lobsters and dealing with them as suggested in another part of our report.

OBJECTIONS TO LOBSTER POUNDS SUMMARIZED.

There are many objections to lobster pounds, which demand consideration, from which it is apparent that the benefit to the fishery as a whole is not proportionate to the cost and possibilities. A lobster pound can only accommodate a small part of the total local catch of female lobsters, and to establish them in every locality would involve enormous expenditure. Were fifty pounds established on the Atlantic coast alone it would cost nearly three times the total Dominion expenditure per annum on the whole of the hatcheries of Canada, Atlantic, Great Lakes and Pacific coast hatcheries. To summarize the main objections, it may be said:—

1. Lobster pounds can only be of local and limited benefit, and protect only one sex, viz., the female sex. The male lobsters should be protected or a shortage of males would mean that vast quantities of eggs would not be fertilized and would perish. Professor Herrick states that under natural conditions 100 males are required to effect the vivifying of the eggs of 106 female lobsters. Thus only a small proportion of egg-bearing females are saved by lobster pounds, and an increasing number of females would become unproductive in the sea by the decimation of the males in any one locality.

2. It is not a fair and equitable arrangement that one section of fishermen should be paid out of the public funds to do what is in their own interest and their own profit to do for themselves.

3. The young fry hatched out while the she lobsters are impounded in artificial enclosures are not in natural surroundings for food or growth, and if in any numbers would attract perch, cunners, and other predaceous shore fishes so that the young would be destroyed.

4. Practice and experience has shown that as a rule the impounded lobsters become sickly in closed pounds, and die in numbers. The Baker pound in Cape Breton suffered a serious annual loss on that account.

QUALIFICATIONS OF LOBSTER HATCHERY OFFICERS.

We have found in the course of our investigation that the officers in charge of most of the lobster hatcheries in the maritime provinces had not the necessary accurate knowledge or experience to ensure success in the somewhat important and special work given to them. To carry out lobster hatching with complete success the officer in charge should be thoroughly posted in the habits and peculiarities of the adult lobster and in the life history and special features of the young lobster from its development in the egg and after hatching.

We would urge very strongly that in appointing lobster hatchery officers the department should ascertain what amount of technical knowledge and experience the parties proposed for appointment possess; and in most cases we feel confident that a course of instruction and some practical training in a hatchery is necessary before officers appointed to hatcheries should take up their work. No doubt the Biological Board would be able to make arrangements for some course of instruction which would be of great value and supply the need to which we refer.

SMACKING OF LOBSTERS.

It is difficult for this commission to make any recommendations in the direction of confining fishermen and packers to their own localities, but we are strongly of opinion that neither packers nor fishermen should be permitted to wander at will over the shores and recklessly exploit and deplete areas distant from the localities in which they live. It might indeed be desirable to specify in a canner's license the geographical limits within which he should obtain his lobsters, so that this would discourage and do away with the carrying of lobsters from long distances for the purpose of packing. In itself there is no harm in lobsters being packed in one locality which have been caught in another, but, as already pointed out in this report, the effect of this tendency which has been increasing in recent years has been to overfish localities in order to supply the canners in other areas who had no interest in the preservation of the lobsters in localities where their canneries were not situated.

Fishermen also, in our opinion, should be confined to their own localities, so that such cases as the Prince Edward Island fishermen on the one hand and the New Brunswick fishermen on the other in the Straits of Northumberland, could be effectively dealt with, and fishermen from one province should not set their gear in the waters of another province, as has been the case for some years. As a matter of fact, at the present time fishermen do mainly rely on the lobsters in their own locality, and the packers also in some cases depend upon the local supply of lobsters for their pack, but the tendency has been growing in recent years to extend the field of operations, and a cannery that has encouraged the destruction of the lobsters in its own locality can still rely upon lobsters obtained from a distance to keep it in operation. The increased use of gasoline launches also tends in the same direction. But at this stage we do not make any recommendations upon this point.

LOBSTER TRAPS—WIDTH OF LATH, ETC.

Testimony has been received in various localities very strongly protesting against the enforcement of the regulation regarding the wider space between the laths than has been in general use for many years. Fishermen and packers who have experimented with the altered traps find that either there is no difference in the nature of the catch, no decrease in the number of small lobsters caught, or, as was distinctly stated to the commission on many occasions, the number of small lobsters actually increased in these traps which had the wider space between the laths, the small lobsters more readily gaining access to the trap on account of the wider space.

Notwithstanding that the new regulations came into force on January 1, a great majority of the lobster traps have not yet been altered, and as they cost, set, 80 or 90 cents each, the alteration of the trap would be a very heavy burden for the fishermen to bear as their old traps are not by any means worn out and the building of new traps or the alteration of the old ones would involve considerable expense. We are convinced, therefore, that it is better to establish a size limit involving the liberation of small, undersized lobsters as being more readily carried out and more likely to protect the lobster supply than the enforcement of the new trap regulations. We would therefore strongly recommend the rescinding of the regulations requiring a wider space in the lath and a larger mesh at the ends, viz., subsection 17 of the Lobster Fishery Regulations. section 5, authorized by Order in Council, September 30, 1910.

OFFICIAL STAMP FOR LOBSTER CASES.

For nearly twenty years a system of stamping legally packed lobster cases has been carried out by the Department of Marine and Fisheries.

The details of the scheme were devised by the Commissioner of Fisheries (chairman of the present commission), and imposed the following conditions:—

1. That official stamps, consecutively numbered, should be supplied to the fishery inspectors, and by them handed over in the required quantities to the subordinate officers, namely, the fishery overseers. These stamps were to be affixed to the cases of lobsters containing 48 one-lb. cans when requested by any lobster packer who had a sufficient number of cases ready for shipment. After the close of the legal open season no lobster stamps were to be affixed unless through some special circumstances which were satisfactory to the Minister of Marine and Fisheries, and the presence of a stamp on any case of lobsters thus guaranteed that it had been packed in the open season.

2. The lobster stamps on the close of the fishing and packing season had to be returned immediately to the department to be checked over, so that the department had information by returns from the officers as to the number of cases packed by each canner and the number of stamps affixed, and the balance returned from each district of unused stamps was a check upon the number of legally packed cases of lobsters.

3. Each year the colour of the official stamp was changed so that the stamp was not only a guarantee of the case of lobsters on which it was placed being packed in the open season, but it also by the colour indicated the year in which the case was packed. This was found to be of considerable advantage to the trade, and it was a further guarantee against abuse on the use of official stamps. The colours of the stamps in successive years were red, green, yellow, brown, etc. The number on each stamp, however, had no reference to the license number of the cannery, nor did the stamp indicate the locality in which the lobsters were packed.

The foregoing conditions were found of advantage in carrying out the provisions of the Fisheries Act, chap 51, which provided for the licensing of lobster canneries, stamping of cases, etc.

Various difficulties soon arose in connection with the stamping of lobster cases. Packers complained that their shipments were often delayed owing to the impossibility of the local officers attending at the canneries to stamp the cases when required. Also, various sizes of cans were introduced, in place of the original uniform one-lb. can, so that a case of lobsters, which at one time always signified 48 one-lb cans, in later seasons might contain various quantities of smaller-sized cans, and there was no uniformity amongst the packers in regard to size of can, some packing quantities of ½, ¼ pound cans and other weights.

Changes had therefore to be adopted in order to meet these different conditions, and it was finally decided by the department to supply each licensed packer with the quantity of stamps which his license called for, as each license stated the number of cases which the canner intended to pack. A further change was the adoption of the license number as the number stamped upon the official label, and two results followed: namely, that packers were found to be most careless in the use, or rather, the abuse, of the stamps placed in their hands, and it was found almost impossible to keep track of the stamps and to prevent their illegal use; and, further, the officials found the utmost difficulty in keeping check upon the stamps which bore the license numbers, and in many cases packers got the wrong labels, and much confusion resulted.

The Commissioner of Fisheries (chairman of the present commission) several times suggested that in view of the impossibility of strictly carrying out the system of official stamps as originally devised the whole scheme should be either abandoned or very seriously modified. But many prominent lobster packers strongly objected to the abolition of the official stamp, which, they claimed, had given a certain status to the Canadian lobster, as it stated on its face that the contained lobsters were legally packed in Canada, and these packers thought that the absence of an official stamp might act unfavourably in foreign markets.

It is clear, however, that under the present system an immense amount of routine work is necessitated without any adequate check or real guarantee of the quality and legality of lobsters contained in the stamped cases. During the tour of the commission many instances came to our notice of very serious abuses in the misuse of official

stamps, and the members of the present commission are convinced that no benefit adequate to the cost and labour in connection with this official stamp system results, and they feel no hesitation, therefore, in recommending that the official stamp be abolished, and that the quality and legality of canned lobsters be ensured by a better and more effective official supervision and inspection.

Opinions were by no means unanimous amongst the leading men in the lobster industry within a few years after the stamp scheme had been put in operation. In September, 1897, a very prominent packer who had been active in making suggestions *re* the official labels, wrote to the chairman of the present commission as to abuses that had arisen; he said, 'Attempts have been made at Point Prim and Egmont Bay—and in New Brunswick particularly, so that more or less illegal packing is going on, and the way it is managed is this: they put before the fishery overseer a certain pile of cases during the legal season, mixing with them a number which are empty, and get him to stamp the empty ones with the full ones, and in this way they manage to pack later on and ship them with the official label affixed to the cases.' The manager of a large packing company at that time said he was convinced that the stamps were a premium on fraud owing to such abuses. A prominent packer on the Shediac shore, N.B., regarded the stamps as very satisfactory; but it was necessary that the officer should handle them, as he stated in a letter to the department some years ago. Another packer agreed that the stamp system worked well, but it was clear that there was much variety of opinion, and after fifteen years further trial and a total change in the method of handling and affixing the stamps, the effect of these stamps in lessening illegal packing is doubtful, if indeed it does not encourage the putting up of illegal cases of lobsters.

RECOMMENDATION *RE* BRAND *V.* STAMPS ON CASES OF LEGAL LOBSTERS.

We have given much consideration to the system of stamping legally packed cases of canned lobsters, in view of much dissatisfaction which we have found to exist regarding the method of carrying out clause 37 of the Fisheries Act, chapter 45. We are of opinion that such official stamping should be abolished unless strictly carried out on the lines originally devised whereby all stamps should be affixed by a fishery officer in person when ready for shipment from a lobster cannery. This method alone can guard against ready abuse, and it should be a criminal offence to remove any such stamps, nor should any person have in his possession any such stamps other than an authorized fishery officer. Failing such strict adherence to the above method, we would favour the branding of cases of legally packed lobsters by an official burnt brand. The brand to be supplied by the Department of Marine and Fisheries to each authorized officer, and to bear a letter denoting his district and a number signifying the officer affixing the burnt brand, and such branding apparatus to be kept in the possession only of the fishery officer to whom the department supplies it, and to be used only by him for the purpose prescribed.

ISSUE OF LOBSTER CANNERY LICENSES.

The commission found that in a great many districts the number of lobster canneries licensed by the department was altogether excessive. In small bays, which would admit of two or three canneries at the outside, no less than six, eight, or even ten canneries were found to have been permitted or authorized by the department.

Almost from the time of Confederation the chief officers of the department had regarded it as an essential part of their duty to keep some kind of wise control over the number of licenses issued for any particular fishing industry. Before new licenses were issued it was the rule to inquire most particularly into the local conditions of

the fishery, and if in the judgment of the local overseer or the inspector or the chief officer in Ottawa the fishery would not bear further exploitation, new licenses were refused. No doubt this caused considerable complaint, as parties were continually urging that they had as much right to carry on a fishing enterprise as other parties already engaged in it. The refusal of lobster-canning licenses was a special cause of discontent, and it was claimed not only by the packers themselves but even by members of parliament that, as there were only a certain number of lobsters to be caught each season, the department had no right to decide that these lobsters should be utilized by only two instead of ten packers. They claimed that the increase of small packers would spread the benefits of the industry wider and would avoid any possibility of monopoly.

The department in recent years has devised a system of conditions for what is called the standard lobster cannery and licenses were issued to all applicants who could guarantee that their new establishments complied with the conditions. As in most cases the conditions were those which obtained generally, new canneries received their licenses, and the consequence is that a large number of new packing establishments have arisen. A great number of these small packing establishments contribute their seasonal pack to some large firm or company of packers so that the monopoly referred to really continues; but the operation of packing, instead of being carried on in a capacious and well conducted establishment at some central point, is carried on in all kinds of out-of-the-way localities in small establishments and under daily conditions which cannot be controlled, and which are detrimental to the best quality of packed goods. The commission would urge with the utmost emphasis that the old system of thorough control of the issue of licenses be resumed, and that the department in Ottawa if not possessed of the necessary information in every case which may arise should in every new application require a special report from the inspector or responsible officer. Such report should state the candid opinion of the officer as to whether a new license would be detrimental or would injure the local lobster supply. The department would then take the responsibility of refusing licenses, and, should an appeal be made to the minister, it would suffice by way of reply that the department had fully investigated the local conditions and that the license should not issue.

A reduction in the number of lobster canneries will really tend to the preservation of the lobster supply, for in spite of assertions to the contrary, the more small canneries there are the more competition there is to make as large a pack as they possibly can and thus increase the total pack and drain the supply of lobsters each season to the utmost. New canneries mean more intense competition in destroying the lobster supply and tend also to a poorer quality of goods, as small factories are less effectively equipped and cannot as a rule conduct the industry on the best lines. The limitation of lobster canneries is absolutely essential in the opinion of the commissioners for the preservation of the lobster supply.

PROPER CANNERIES, NOT SHANTIES, TO BE LICENSED.

The officers are well aware that the law contemplates in issuing a lobster canning license that the establishment mentioned therein should be used for legitimate and recognized lobster canning purposes, and not simply as a boarding-house or storehouse or base of operations for the purpose of enabling the canner, who has encouraged the destruction of the supply of lobsters in his own locality, still continuing to pack by relying on supplies from a distance. No doubt the difficulty may be met under the present regulations if the officers strictly carry out their duties, as a license need not be recommended for an establishment which it is well known is used simply as a shanty or base of operations in the sense described. But inasmuch as many of the officers have not done their duty in this respect, and have countenanced

the establishment of these shanties to the detriment of the legitimate canning industry, some special provision or prohibition would seem to be in the interest of the lobster fishery as a whole.

Standard Lobster Cannery.

The conditions required for a lobster cannery which the department was to enforce by December 31, 1912, urgently demand modification.

Thus, clause 2, referring to the washing of boxes and vessels, should specify that such boxes or vessels shall be of agate ware, porcelain, zinc or galvanized iron or shall be lined with such, and all packing tables shall be covered with plate glass, marble, porcelain, agate, galvanized iron or zinc.

Clause 3, referring to coolers; they should be of galvanized iron or zinc or should be provided with removable, open slats, allowing of thorough cleaning and sterilization.

Clause 4, section B, should omit the words from 'but in locations, etc.,' to the words 'in the ice-house,' and the word 'such' substituted for 'but such' immediately following.

Clause 8 should be rescinded and the words substituted 'all the lobster canneries shall be provided with proper drainage, subject to the approval of the inspecting officer.'

Co-operative Lobster Canneries.

The very desirable and laudable step was sanctioned by the department five years ago whereby fishermen engaged in lobster operations might unite together in a locality and establish a co-operative cannery. Fifteen or more fishermen thus united together would not only benefit by their own fishing operations, but would secure also the profits of putting up lobsters in cans and thus derive far greater benefits from the industry which they carry on.

It has been alleged that in some cases canners do not pay the fishermen an adequate price for their lobsters, and dissatisfaction arose especially as the view gained currency that lobster canners were making very large fortunes by packing lobsters, whereas the fishermen who caught the lobsters and provided the raw product secured the minimum benefit from the fishery.

The laudable object which the government had in view in encouraging by special regulations co-operative canneries and the participation in canning operations of local fishermen united together in a company or packing concern, in very few cases resulted satisfactorily. Many of the so-called co-operative canneries were nothing of the kind. One resident, who might or might not be a fisherman, could secure the names of fifteen parties, farmers or ordinary tradesmen utterly unconnected with the lobster industry, and having secured their names submitted them to the inspector and had them forwarded to Ottawa for the issue of a license. Such an abuse was an injury to the fishermen and an injury to the lobster supply, when outside parties thus came in merely for the purpose of originating new canneries where already there might be as many canneries in operation as the industry could bear. It need hardly be pointed out that in this case, as in many other cases referred to by the commission, the responsibility for the abuse no doubt rested upon the local officer or the district inspector. Such officers must be well aware that the applicants in the cases referred to were in no true sense fishermen at all, and that a co-operative lobster cannery in which the principal interested parties were farmers or local tradesmen had no just claim to a license under the provisions for co-operative fishermen's lobster canneries.

It is essential in the interests of the lobster industry as a whole, and in the interest of those actually engaged in the fishing and canning operations that a system of con-

trol and of refusal of cannery licenses be adopted to prevent the demoralization now going on, and the permanent decline and destruction of this great resource through excessive exploitation.

SUPPLYING GEAR FOR ILLEGAL FISHING.

Much of the illegal fishing for lobsters which has been carried on is directly due to the encouragement given to such operations by lobster packers who have no regard for the welfare of the industry, and whose only desire is to make an immediate dollar out of the lobsters while the supply lasts. Such packers form a very small minority and inasmuch as the greater proportion of lobster cannres suffer every year to a serious extent from this illegal fishing, encouraged by the ease with which traps and gear and cans can be obtained by the fishermen, very strong measures should, if possible, be adopted to meet this grave state of things. In the interest of the lobster supply and in the interest of the packers who have capital invested in buildings and outfit for a legitimate industry, the adoption of stringent measures to prevent the supplying of illegal traps, gear and lobster cans and boats to fishermen for the direct purpose of carrying on illegal fishing operations are absolutely necessary.

We recommend that in the regulations provision should be made that packers who encourage illegal fishing in this way should be regarded as guilty of serious violation of the regulations for protecting the fish. It is a matter of common knowledge that certain packers season after season deliberately supply fishermen with gear for use after the close season has commenced, and such parties should be severely punished. In our opinion the packer who encourages illegal fishing in this way is as guilty, or even more guilty, than the fishermen who pursue this destructive illegal fishing.

MEDIUM LIVE LOBSTERS IN DEMAND.

It is well known that the live lobster business has for many years encouraged the capture of the larger lobsters only. Indeed, twelve years ago there was considerable unanimity amongst the Bay of Fundy fishermen from Kings and Digby on the south side to Charlotte county, St. John and Grand Manan on the west side of the bay in favour of a 10½-inch size limit. The main ground for this request for a large size limit was this: that the live lobster market demanded only lobsters 10 or 10½ inches in length, and that lobsters of smaller size were suitable only for canning, and that the price paid by the canners was disproportionately low for such lobsters, and that if returned to the water they would in a year or two reach the large size which brought far greater returns to the fishermen.

A few years later the fishermen in certain localities in the Bay of Fundy had somewhat altered their view apparently, but the real reason was that certain lobster packers in the State of Maine were desirous to leave their state, where the lobster supply through their canning operations had been jeopardized, and had worked up considerable feeling amongst our Canadian fishermen in favour of a smaller size limit in order to establish themselves in Canada and carry on packing operations. Such packing operations would not be possible were the fishermen's original idea of a 10½-inch limit carried out.

The live lobster business is carried on on an enormous scale in the States of Maine, Massachusetts and New York, and in these states are the principal markets for Canadian live lobsters. Maine and Massachusetts have had in force a large size limit, indeed at one time both states enforced a 10½-inch size limit, but Massachusetts has altered that size limit to 9 inches, and New York State brought it down as law as 8 inches. In consequence of this change in the United States markets, the Canadian fishermen who ship live lobsters urge that a smaller size limit be enforced in Canada

for the live lobster trade. Indeed, it is urged that what are called 'mediums,' that is lobsters 9 to 10½ inches, are really in greater demand than larger lobsters. This contention has a certain amount of truth in it, but the explanation is easy to understand. Parties in hotels and restaurants ordering a live lobster pay at the present time a high price for it and have a right to expect a lobster of good size. It is, however, in the interest of the retailers, if they can get a smaller lobster of less size and supply it to customers as a broiled lobster at the same price as a large lobster, to encourage the importation from Canada of small lobsters. The argument that small lobsters are more tender and sweeter than large lobsters is ridiculous. No one who has enjoyed a fine broiled lobster of good size, say of 10½ or 11½ inches long, will question its excellence; and the whole question is reduced, therefore, to the mere selfish interest of the middlemen and the retailers who find that they can obtain as good a price for a small lobster as for a large lobster.

The commissioners, in the course of their tour, and especially when they visited Boston, made inquiries from various parties as to the real fact whether or not customers preferred a small lobster as a live broiled lobster, and without exception it was found that customers expected a good sized lobster for their money and that the prevalence of smaller lobsters in the broiled lobster business caused dissatisfaction generally and has encouraged a cheaper trade. It has been claimed that the inferior restaurants and smaller hotels prefer small lobsters, but the live lobster business is one which at the present time finds its best paying and main market amongst the better class hotels and restaurants, the broiled lobster being a luxury, and amongst a class of customers who are willing to pay a good price for a lobster of reasonable size.

As commissioners, we feel that we have no right to sacrifice our lobster supply in Canada by encouraging the tendency in the United States to lower the size limit for broiled lobsters, or even to encourage a demand amongst the poorer classes in the United States for broiled lobsters of small size in order that they may get them at reduced prices. The mere demand in a foreign market for an inferior article should have no weight in Canada in deciding this size limit question for lobsters. It is well known that in the United States the paper manufacturers are most desirous to obtain in Canada the raw material for their pulp business, and there was a considerable outcry amongst these foreign buyers when Canada showed herself unwilling to continue to supply their demand. The mere fact that United States buyers preferred raw material rather than to purchase manufactured material from Canadians, or to come into Canada and establish their manufacturing concerns and expend capital in the Dominion, had little or no weight with intelligent Canadians who had the interests of our own country at heart. There is no reason why we should encourage the destruction of our lobsters or allow the capture and exportation of small lobsters, so-called 'mediums,' because a demand has been encouraged by middlemen and retailers in the United States for such inferior lobsters.

OFFICERS TO SUPERVISE SHELL-FISH SHIPMENTS.

If the fishery staff be reorganized on the lines which we suggest, it would be in accord with such reorganization to provide that certain officers should be specially told off at Yarmouth, N.S., Halifax, N.S., and St. John, N.B., to be present when shipments are being made of lobsters, shell-fish and other fish products, whose duty it shall be to see that the carelessness and inadequacy observed in handling these shipments and the abuses to which we have already referred are avoided, and that the shipping of these valuable products shall be carried on in a more satisfactory manner.

SYSTEM OF SUPERVISION OF LOBSTER EXPORT, FREIGHT RATES, &C.

At present there is no proper control or supervision of the handling of lobsters and exportation of the same. The whole business is demoralized and in the worst possible condition, and the rates charged by the transportation companies have increased disproportionately as the service has deteriorated. It has come to the notice of the commission that there is one exception to this somewhat startling affirmation. Fish shipped from St. John, N.B., are said to be most satisfactorily handled, and there could be no greater contrast it was claimed, by parties who gave evidence, between the shipments from Nova Scotia ports and those from the New Brunswick port mentioned. To quote from one of the witnesses, he said there is the greatest possible contrast between the methods of the St. John steamers and the steamers of the three Halifax, Hawkesbury and Yarmouth lines. On the ships of the two last-named ports salmon boxes and lobster crates are transported upside down or placed on end, to the serious injury of the contents, but as the second mate of the St. John Steamers is stevedore, he personally sees that all boxes of fish shipped, especially salmon boxes, are kept in the same position just as they are put on board at St. John, and they arrive at their destination in beautiful condition, instead of being knocked about, injured and broken and their appearance and condition utterly spoiled. There is no reason why all the steamship lines should not be able to handle carefully and properly such valuable shipment as crates containing live lobsters, &c. The rates are fully adequate to a proper service, for the freight rate from Yarmouth to Boston which used to be 50 cents per crate is now $1 per crate, and there are wharfage charges in addition at both ends, the reason for this somewhat high charge being given as due to the special service rendered by the transportation companies. Of course the companies, it must be admitted, freely take fresh fish shipments up to the last moment before the steamer leaves the Canadian port. Pickled or preserved fish would not be accepted unless sent in good time, and the fact that the steamer is often held up after her announced time of leaving affords a ground for extra charges. The commission were on board some of the steamers when fish shipments were put on board at the last moment, and while hurried handling of the barrels or crates is unavoidable, at the same time the crudeness of the methods and the atrociously rough handling of these wooden packages, many of which were broken before they actually were placed in position on board the vessel, showed what good grounds there are for regarding with extreme dissatisfaction the present methods. Crates and barrels are pushed down sloping gangways, and tumbled over and pressed one against the other until they are broken and crushed, and not the slightest regard is paid to the fact that the contents are either valuable fish whose appearance is being spoiled or live lobsters which are being mutilated and killed. The plea that these shipments are received at the last moment and no care can be exercised in handling is not well grounded. All the transportation companies receive bundles of newspapers at the last moment, and these are kept clean, and handled with a certain amount of care because the public would not have torn and dirty newspapers supplied to them, and there is no reason why special care in handling fish shipments on the wharves and in placing them under proper refrigeration or cool conditions should not be exercised, which would justify the higher special rates now charged.

Even more striking is the case of shipments of butter, which no shipping company would dare to handle in the unnecessarily rough and careless manner in which lobster crates and fresh fish packages are constantly handled. Yet the rate for carrying live lobsters is three times the rate charged for carrying butter. It is a well known fact that better facilities are afforded for apple shipments by the shipping companies, worth $3 or $4 per barrel, than for live lobsters shipmpents which are five to ten times more valuable.

LOBSTER FISHERMAN'S PERMIT.

So long as the taking of lobsters on Canadian shores is a free fishery, so long will it be difficult to effectively carry out the preservative measures which are desirable. A free inshore fishery carried on by all and sundry without let or hindrance, excepting the formal restrictions of size limits, kind of gear, specified open seasons, &c., must in the course of time become exhausted. It is difficult to detect and to enforce laws on fishermen whose names are not on any official record. In the interest of the regular lobster fishermen a formal permit to be issued by the Dominion Government has been strongly approved all along the Atlantic shores at the sittings of the commission. It is being widely realized that all who engage in lobster fishing should fish on equal terms and under equal conditions, and their name and habitation be formally recorded each season. A printed permit authorizing the holder to fish lobsters during the legal season applied for, admirably meets the condition in the opinion of a large proportion of the fishermen who gave evidence. Issued without fee it would cost the fishermen nothing, and binding all to obey the conditions printed thereon (viz., the current regulations), it would put all the men on the same footing, and would entail in case of wilful or repeated violations of the regulations, cancellation and withdrawal of the right to fish for, say, the season then current. In the opinion of most of the fishermen it would especially render effective the 'berried or seed lobster prohibition,' and under a permit system all fishermen would bind themselves to liberate seed lobsters and thus help unitedly to not only keep up the supply of lobsters in the future but vastly increase it. The permit suggested is appended below.

SUGGESTED FORM OF LOBSTER FISHING PERMIT.

GOVERNMENT OF THE DOMINION OF CANADA.

Lobster Fisherman's Permit.

(Issued without fee.)

FOR THE SEASON OF.....

THIS PERMIT is granted to..... of.....
to fish for, catch, buy, sell or possess lobsters in the territorial waters of.....
between ..... and ....
under the provisions of the Fisheries Act and regulations under it, which regulations are printed on the back of this permit.

.. ..

Dominion Inspector of Fisheries for District.....

Countersigned by the Local Fishery Officer. .....1[illegible]

OYSTER FISHERY OF CANADA.

Canada is perhaps the only civilized country in which the oyster fishery, as a national resource, is not carefully developed. The State of New York completed a survey of its oyster beds, under the able superintendence of Mr. Eugene G. Blackford. Connecticut made an exhaustive survey and issued easy and practical regulations for private culture. Delaware, Virginia and other states have comprehensive rules. What has been done in France, the Netherlands, Britain and, in a lesser degree, in Germany, need not be here mentioned. Suffice it to say that in all the countries named, the government can lay its hand on any spot of ground suitable for oyster culture, and the public are encouraged to develop the oyster industry both by public and private culture. In Canada it is not so.

Canada possesses oyster waters which should be as extensive as the State of New York. These New York waters give 2,000 oystermen a permanent living, and a capital of $6,000,000 is investel in culture therein. In the whole of Canada no one man makes his whole living season by season.

But where man interferes, with his exhausting methods of fishing and his selfish disregard for the future of the fishery, he disturbs the balance which has obtained between the natural and opposed powers of production and destruction, and in a comparatively few years reduces the productivity of the natural beds to the verge of depletion. The oyster, in its simple, undesigned, mechanical mode of life, hampered by all its specializations and loss of sensory and locomotory organs, cannot evade or defend itself against the persistence and the contrivances of man. If the oyster could reason, it would regard man as its greatest enemy; for he not only calculatingly takes every specimen that can be found, but in various ways destroys others that he cannot see, and almost maliciously interferes with all stages of the developing young. In the first place, he strikes at the very existence of the oyster in fishing for and removing from the beds the full-grown breeding individuals and those next in size that should take their places. In doing this he removes spat on the adults that are too small for use and should be left in the water where they can grow up. At the same time the removal of all these reduces the amount of natural cultch. The process of fishing cannot help but break down the surfaces of the beds, burrying living oysters under dead shells or tumbling them into mud. In a similar manner the fishing for quahaugs interferes with oysters and spat, and stirs up mud in the water which settles on the surfaces of shells, rendering them unsuitable for the attachment of larvæ. In all this the fishermen's influence on the oyster is one of destruction, injury, hindrance, for which he makes no amends. To pursue these practices would mean ultimate extinction.

In order to prevent such a calamity, the legislature has imposed certain restrictions upon the fishermen, limited the time, place and manner of fishing, the size of the oyster, &c.

Oysters lie on the top of the beds and require a smooth, firm surface. Quahaugs, on the other hand, burrow in the mud, and are found broadcast in the tidal rivers, bays, harbours, &c., around the coasts. They find a home in the mud even on the edges of the oyster beds, and frequently they are located in large numbers on soft spots scattered over the beds themselves.

Quahaugs are taken with rakes, having long iron teeth. The rakes are driven into the mud and are lifted to the boat's edge loaded with mud, and any quahaugs that may be found therein are removed and the mud thrown back into the water.

The use of such rakes on the oyster beds themselves will be readily appreciated. The crust would be broken through, and the whole surface roughened. Moreover, the mud and silt that would be carried away by the tides and currents when the rakes were being lifted, or when it was thrown back therefrom into the water, would be

carried over all the area round about, and finally deposited on the surface of the beds, not only smothering the oysters thereon, but ruining the possibility of a favourable 'set of spat.'

What the Canadian oyster fishery is, and what it might readily be under different conditions form a subject for grave, and from many points of view, painful reflection; but the possibilities for the future are so amazing, if proper lines of procedure are adopted and followed, that the subject is one which calls for the closest and most thoughtful attention.

While the table of statistics included in this report shows a serious falling off in the yield of the fishery, particularly in more recent years, a study of the fishery itself indicates a still more serious condition of things, and the wonder is that the beds have remained productive so long.

In the earlier days only the best known and most productive beds were resorted to, and as the demand increased not only did more men resort to the fishery, but greater and greater efforts were made to obtain large catches, so that year after year the beds were raked and reraked, other and less important beds were resorted to, which being smaller were the sooner denuded, until now the whole oyster-producing areas of the maritime provinces are in a seriously depleted condition.

Hence, a new but grave danger to the permanence of the natural oyster beds arose, in the instance of a somewhat kindred fishery, of considerably greater value, necessitating its control, and from the point of view of the protection of the fishery itself, its needless curtailment, if the oyster fishery was to be maintained.

This, it may be added, by way of parenthesis, is one of the perplexing conditions that so frequently arise in the protection of the fisheries generally.

An order in council was accordingly approved, on October 22, 1901, providing that fishing for quahaugs in the bays, harbours and other waters of Canada, where oysters were taken, should be restricted to areas marked out by the local fishery officer.

On November 14, 1901, to prevent further destruction of the beds in the locality by mud diggers, a regulation was adopted prohibiting mud digging in a certain portion of Trout river, Prince county, Prince Edward Island; also in a portion of Bideford river in the same county.

As, however, the oyster fishery was still going down, on April 15, 1907, a regulation was adopted, extending the close season from May 21 to September 22, both days inclusive, to from April 1 to September 30, both days inclusive.

As the fishing of oysters through the ice had already been prohibited, the effect of this regulation was to curtail fishing to what might be carried on between October 1 and the time the ice makes in the fall, which taking into consideration the tempestuous weather usually prevailing at that season of the year, limited fishing to about a month or six weeks in the year.

The present conditions in Canada ought not to exist, and should not be allowed to continue.. That artificial oyster culture could be carried on along practically the whole coasts of the maritime provinces is amply demonstrated by the fact that natural beds exist, or have existed at intervals. In New Brunswick, natural beds have been found between the Caraquet Banks, at Caraquet, St. Simon, Shippigan harbour, and Gully Tabusintac, Burnt Church, Bay du Vin, and many other places, in Miramichi bay; Kouchibouguac, Richibucto, Buctouche, Cocagne, Shediac and Bay Verte. In Nova Scotia oyster beds have been found at River Philip, Pugwash, Tatamagouche, River John, Pictou, Tracadie, Mabou, Margaree, Sydney and nearly everywhere in the Bras d'Or lakes, Albert bridge, Country harbour, St. Mary's river, Liscomb harbour and Jeddore head, and practically the whole coast line of Prince Edward Island is dotted with oyster beds.

At the present time there are possibly 5,000 acres of producing natural beds in New Brunswick, 4,300 acres in Prince Edward Island, and 1,250 acres in Nova Scotia, or in all 10,550 acres. The area that might be made oyster-producing, with the

expenditure of some capital, and considerable industry and energy is, broadly speaking, limitless, as the conditions as previously stated, appear favourable for oyster culture, on practically the whole coast.

Even as long ago as 1889, Canada imported 1,698 barrels of oysters in the shell, 234,502 gallons in bulk, and 198,543 pounds in tins, and it was then claimed that only one-third of the oysters consumed in Canada were produced there.

During the fiscal year, which ended on March 31, 1910, there were imported into Canada from the United States, 4,150 barrels in the shell, 226,128 gallons in bulk, 454,850 cans of one pint and under, 17,258 cans containing over one pint, but not more than one quart, and 37,703 lbs. otherwise prepared, or preserved, the total value of which is placed at $368,412.

There is no valid reason why, under proper conditions, the supply of Canadian oysters should not only be great enough to fully supply our own markets, but to enable an export trade to be carried on as well.

VALUE OF OYSTER FISHERY PRODUCTION AT 10-YEAR INTERVALS—1881-1911.

Oysters.	Nova Scotia.	New Brunswick.	Prince Edward Island.
	$	$	$
1881	6,810	25,239	62,445
1891	12,954	44,802	123,090
1901	6,760	57,840	99,888
1911	9,570	84,270	78,848

OYSTER LICENSES.

The system of oyster leases, which is being adopted through the action of the Dominion government in handing over the superintendence and control of the oyster and clam fisheries of the maritime provinces to the several provinces, introduces a new phase of the shell-fish industry.

The issue of oyster leases for definite areas, as all who are acquainted with the oyster industry in various countries are well aware, is the only effective method of cultivating and preserving such an important fishing industry. Leased areas, however, are to be mainly confined to what are called barren bottoms, that is, areas either adjacent to or forming part of recognized oyster beds which have been fished out and utterly destroyed and thus become unproductive, or have never been productive of oysters under natural conditions. The public beds which are productive will still continue to be available for oyster fishermen who operate under annual licenses, and there are several points which the commission feel bound to report in connection with the issue of such oyster licenses.

The commission has been informed time after time in the course of its sittings that far too many licenses have been issued by the Department of Marine and Fisheries, and now that such licenses are to be issued by the provincial authorities it is desirable that they should be advised to control the issue of licenses so as to keep the number of licenses within wise limits. Not only so, but licenses should not be issued to parties who live at considerable distances from the local areas. Not only are too many licenses issued locally, but, as in the case of Bay du Vin beds, in addition to the local fishermen over 30 boats came all the way from Shediac, 75 miles away, and about 100 boats came from Caraquet. These outsiders are allowed freely to maraud the local oyster beds, and inasmuch as they have in most cases destroyed their own local beds they are indifferent to the preservation of beds distant from their own locality. Were oyster fishermen confined to the localities in which they live, and not

permitted to obtain licenses for oyster fishing on beds at considerable distances away there would be a greater tendency to preserve the beds in good condition. If the number of licenses in each locality were limited so as to allow a judicious quantity of oysters to be taken each year from the public beds there is great hope that these beds would improve year by year in the future. The leased areas which will be under cultivation by private lessees would not retain all the spat or seed, and much of it will be scattered over the public beds to the benefit of these beds. In return for such benefit, the government concerned should prevent the continued excessive exploitation of public beds.

The commission are aware that for over twenty years an oyster expert of great experience has been engaged in restocking depleted public beds. Mr. Kemp, the expert referred to, who belongs to a family associated with the Whitstable oyster industry in England for nearly two centuries, has done splendid work in various localities, at Shediac, Caraquet, Richmond Bay, &c.; but his work has been largely made nugatory owing to the fact that as soon as he had restored and restocked a destroyed area it was open to indiscriminate public fishing, and the work of several years by Mr. Kemp was undone in the course of a season or two. It is undeniable that Mr. Kemp's operations in cleaning and levelling beds and in replanting them were of the highest local benefit, and certainly showed what systematic cultivation could do in making fine productive beds of areas which had become valueless. Such beds were not only more productive each season, but the oysters were of a better shape and quality. And in the opinion of this commission it is desirable that areas which have been restored by the Dominion inspector should remain closed, either partially or wholly, for a few seasons after the conclusion of the restocking operations, and when reopened should be fished in alternate or supccessive areas, so that while one public area is being fished the other remains as a breeding or seeding ground.

DEPARTMENTAL SYSTEM OF DESTROYING OYSTER ENEMIES.

It has been found that large mops of frayed rope and loose bunches of cordage suspended to dredges baited and called 'tangles' are effective in capturing starfish, which cling to such tangles most tenaciously. We would suggest that an experiment should be tried in the early part of the summer season on the public oyster beds of the marititme provinces with such mops or tangles slowly hauled over the surface of the beds. The crews of the fishery cutters might be told off to do this duty, especially in June before the spawning of the oysters commences. It would without doubt have a good and beneficial effect and be of immense service to the public oyster beds, which would be in some localities threatened with early extinction if these enemies (starfish, sand stars, &c.) are allowed to increase.

Fishermen should not break up starfish and throw them overboard but bring them ashore in order to kill them. Each fragment of a broken starfish is stated to develop into a perfect starfish, and throwing living fragments overboard is the best method of increasing the abundance of these destructive pests.

TECHNICAL INSTRUCTION TO FISHERMEN AND OTHERS.

The commission have been impressed with the fact that there is no greater obstacle to the improvement of the fishery resources of the sea coast of Canada than the lack of technical knowledge generally among the maritime population.

It is true as practical men no population is better fitted to carry on the fishing industry than the fishermen of the Atlantic coast, who rank among the first in the world as able and effective exploiters of the resources of the sea.

In order, however, to improve and to preserve their permanence many of these fishery resources, especially the lobster and shell-fish resources, some knowledge of the results of scientific investigations is absolutely essential. Without such knowledge, many of the best devised regulations would be misunderstood, and regarded as unjust to the interests of the fishermen and of the fisheries generally.

We therefore strongly recommend that some arrangement should be made whereby the fishermen could meet in conference and be addressed by qualified experts on the more important technical aspects of the fisheries; and the life-history and habits of important fishes, the lobster and the oyster, etc., could be fully explained so that our fishermen may be in advance of other fishermen in regard to accurate knowledge as to the general resources on which they depend for their living.

As a commission we are convinced that with such knowledge the fishermen would be most anxious and ready to help in the protection and preservation of the fisheries by such regulations as we have ventured to recommend in our report.

In some localities where knowledge has been disseminated the fishermen are generally more ready to see the utility of wise regulations and, indeed, to favour the enforcement of conditions calculated to improve their means of livelihood.

Oyster and clam cultivation can only be carried on by the fishermen if they possess some knowledge as that which we recommend should be spread among them under the auspices of the department either through the Biological Board or some other means.

FISHERY STUDENTSHIPS UNDER BIOLOGICAL BOARD.

Our inquiry into the lobster and shell-fish resources of the Atlantic coast has shown us that in spite of the large amount of information which has been accumulated by biological investigation in the United States, in Canada and in Europe, there are a large number of important points in the habits and life-history of the shell-fish referred to which have still to be decided. The lobster, which has formed the subject of very elaborate study by specialists both on this continent and in Europe, presents many important problems which should be settled in order to satisfactorily handle the lobster fishery from a practical standpoint. It is claimed, for instance, that for the permanence of the lobster supply as many lobsters of one sex as of the other should be maintained in the sea, otherwise the vast quantities of eggs produced by the female lobster would remain infertile; but this is a point which has never yet been decided by scientific specialists. It is a point which could readily be decided by accurate investigation. There are many other points of a similar character which could be studied and which could be finally decided at the biological stations if young and qualified workers were engaged to take up these problems.

We therefore strongly urge that at least six studentships or scholarships should be provided to enable able workers from our Canadian universities, after completing their scientific studies, undertaking the investigations of such fishery problems as those to which we have referred. These fishery studentships or scholarships would enable a large amount of this necessary research to be carried on, and the fisheries would immensely benefit thereby. Protective regulations would be on a firmer basis if there were more accurate information on which the Department of Marine and Fisheries could proceed.

Under this head provision might be made to encourage graduates from fishery institutes or biological stations in Europe to come to Canada and undertake scientific researches under the board.

REORGANIZATION OF THE FISHERIES SERVICE.

Your commissioners were appointed to investigate the shellfish industries from every point of view, and while at first sight it might appear beyond their scope to make recommendations regarding the inside and outside fisheries service, they feel bound, in view of the importance of a thorough official supervision of the great industries upon which they are reporting, to go as far as to recommend certain essential changes in both services at Ottawa and in the maritime provinces.

(a) *Outside Service*

The present system of a district inspector in charge of a large area of territory with a series of local overseers having the powers of a justice of the peace for the purpose of the Fisheries Act, and under these local overseers a third series of fishery guardians, most of them employed at a nominal per diem rate for longer or shorter periods each year, has several serious defects. The men appointed have in most cases been appointed not because they possessed any qualification or any special knowledge of a fishery officer's duties. Many appointee's were totally new to fishery matters altogether, but even where, as has been the case in a great number of instances, a fishery officer had been a fisherman or actively engaged in some fishery business, such officers being local residents were surrounded by friends and relatives. The local population felt, when a relative or friend held a position of fishery officer, that they could do much as they liked, and it was difficult, and even impossible, for the officer to attempt to carry out the law or prosecute his own relatives and friends. Various witnesses who appeared before the commission have urged that the whole of the fishery officers appointed in any district should be entire strangers; but this, in our opinion, would be not only an extremely drastic step but would be a disadvantage. We are of opinion that a fishery inspector should be paid an adequate salary, and his travelling expenses, and by giving him an adequate salary he would be independent of petty local conditions. The inspectors indeed in many districts, though local men, have performed their duty with a good deal of energy and success. An inspector who belongs to his district has local knowledge which is of great advantage to him in carrying out his duties. An utter stranger would find himself continually baffled by the attempts of men violating the law doing so in localities which it would be a difficult task for a stranger to discover. Illegal fishing might be carried on in hidden coves and bays, or on portions of lakes and rivers, which only a man with local knowledge could discover.

With the overseers who might preferably be styled fishery officers it is different. An overseer should be nominated by, and would be under direction of the district inspector, and would have the advantage of the inspector's special knowledge of the district. We are therefore of opinion that fishery officers in one district should be men brought from another district, when considered necessary, so that they can act without bias and not feel themselves hampered by such conditions as have been mentioned above. An entire stranger would feel himself able to enforce the law with much more readiness and strictness than a local resident living amongst friends and relatives. These local officers should also be paid better salaries more adequate for the efficient discharge of their difficult and important duties.

With respect to the temporary officers, hitherto known as guardians, appointed during special stress of work or during short close seasons and the like, strangers also would be far more efficient than local residents. Indeed so useless in the opinion of a great many fishermen and others in the fishing business, have local guardians appeared, that the commission has been repeatedly asked to recommend the total abolition of the whole force of fishery guardians. In the opinion of the commission, however, there is work for special officers at particular periods of the year, and tem-

porary officers, if properly paid, and if the right kind of men, can be of great use for a few weeks or a few months each year in assisting the fishery overseers of their locality and the inspector throughout his district.

Along the sea shore it is absolutely necessary that gasoline launches should be provided, and that these should be swift, well-designed boats, able to overtake the gasoline boats which are largely coming into use amongst the fisheries. The department, the commission is informed, has already adopted some such scheme as we now suggest, and has procured a number of gasoline boats; but, if the information of the commissioners is correct, these boats in design and in speed and in every feature are altogether unlike the patrol boats that in the opinion of the commission the officers should have at their disposal. It is stated that some of the new patrol boats are very unsafe in heavy seas, and that their speed is such as to render them useless for patrol purposes. The commission would therefore urge that the whole patrol system must be made more effective, and illegalities and injurious practices in violation of the regulations more actively suppressed.

So urgent has a thorough and even drastic reorganization of the fisheries' service appeared, not only to those actually engaged in the fishing industries, but to others outside to whom the preservation of valuable national resources is of paramount moment, that the Conservation Commission vigorously took up the matter.

At the meeting of the commission in Ottawa, in January last, a special report was read in which 'the striking ineffectivness of the present fisheries protective service was pointed out. The failure of the service to enforce the regulations, it was stated, not only was detrimental to the interests of the fisheries but tended to engender in the coast communities a disrespect for all law.

'A thorough and immediate organization of the protective service was recommended, all appointments to be based on the capability of the applicant to discharge the duties of his position. It was further pointed out that in any reorganization, provision should be made that all officials should be paid a sufficiently large salary to enable them to give all their time to their duties. Officials, on appointment, should be strangers to the district to which they were assigned and should be moved to new districts every three or four years.'

SUGGESTED FISHERIES AGENT IN EACH PROVINCE.

In each province there should be, in our opinion, a fisheries agent of the department, with the necessary staff to assist him. Such official would be the chief fishery official in each province and would correspond to the existing agent who deals with marine matters in each of the maritime provinces. The fisheries for the prompt and effective despatch of business require some such well qualified and authorized individual, so that matters could be dealt with by him in accordance with departmental rule and instructions without the delay and inconvenience of continual reference to the department at Ottawa. The fisheries have suffered from the lack of such agencies, and their establishment would be a benefit to the fisheries and to all engaged in the industry. The matter has already received some notice in the press in the maritime provinces, and in this connection the following extract is interesting, taken from a Nova Scotia journal:—

'A provincial fisheries agency, somewhat similar to the marine agency in Nova Scotia,should be established. The head of this agency, like the Deputy Minister of Fisheries, should be a man of practical acquaintance with the industry. This agency would look after the provincial statistics, would see to the enforcing of regulations throughout the province, would keep constantly in close touch with conditions throughout the province, and would form a much needed connecting link between the local trade and the department at Ottawa.

'While the people of Nova Scotia regard the establishment of a provincial agency as a desirable thing for some others also of the provinces, they consider that the addition of some ten millions of dollars a year to the wealth of the country from the fisheries of Nova Scotia entitles that province to some special consideration in that respect. With the establishing of such an agency should also come a complete reorganization of the service in the province. It is felt that much better service could be obtained by the appointment of fewer officials than there are at the present time and giving them more adequate salaries so that they could devote more attention to their duties.'

(*b*) *Reorganization of Inside Service.*

There is a prevalent feeling amongst the fishing population and amongst those with vested interests in the fishing industries that the existing unsatisfactory state of these industries is due in large measure to lack of practical knowledge and sympathy with them at headquarters. And, while we do not wish in any way to criticize the organization of the fisheries branch at Ottawa, or the personnel thereof, we feel that the industry is of such great importance that only men of experience and practical knowledge should be appointed to every office having direct control over the fisheries. As an important maritime newspaper declared not long ago:—

'It is not too much to say that in the past it has sometimes been felt that the authorities in Ottawa were not in sufficiently close touch with our local conditions and needs.'

Amongst the outside staff, as we found in our tour, there is a lack of confidence and a want of co-operation between the officers in Ottawa and the outside inspectors and overseers. As old experienced officers in the fishery branch of the Department have died or retired, their places have been filled without regard to practical knowledge and experience.

SUMMARY OF CONCLUSIONS AND SUGGESTIONS.

The following summarized conclusions and suggestions are set forth as preliminary to the main recommendations, which follow, in order to facilitate reference, most of them not being included in the said main recommendations of the report.

1. *Effect of lobstering on other fisheries.*—It is undeniable that the attention of the fishing population on the Atlantic coast generally has been so concentrated on the lobster fishery, and efforts confined to capturing lobsters, that the sea fisheries have suffered neglect. In some localities the population depend almost exclusively upon lobstering. The fishermen are not now fitted out, as they once were, for cod, haddock, and other fishing, and men are often difficult to obtain to carry on these fisheries. The result is a widespread neglect of valuable resources in our maritime waters, and reliance more and more upon one industry, which in the opinion of most people is in danger of depletion.

2. *Lobster extensions unwise.*—Injury to the lobster supply, general demoralization of fishing operations, and dislocation of business, have arisen from the granting of extensions of the lobster fishing season, in compliance with petitions and under influential local pressure. Witnesses almost universally stated that adherence to the dates specified officially, and refusal of extensions, are absolutely necessary. We recommend that under no circumstances should extensions be granted. The regulations should be statutory to render change and modification less easy.

3. *Closing of canning operations seasonally.*—Each season the canning establishments should be compelled to close down, so far as lobster canning is concerned, within three days of the expiry of the date on which fishing by law ends. Rigid closure would greatly help to secure observance of the limits of the open season.

4. *Regulations should be statutory.*—We think that it is highly desirable that lobster regulations should in all cases be statutory, and should not admit of easy change or amendment to meet merely temporary conditions. The law should be stable and fixed, and in the best interests of the industry.

5. *Lobster pounds.*—We do not favour lobster pounds. Many reasons can be adduced, some of them detailed in this report, but the following may be briefly stated:—*a.* Fry hatched out are in uncongenial and unnatural surroundings, and distant from suitable food ,which occurs abundantly in the open sea. *b.* Shore fish are great destroyers of small shell-fish such as newly hatched lobster fry. *c.* The expense of operation is out of proportion to the benefits. *d.* Unless adopted universally it is unjust to parts of the coast unprovided with such pounds. *e.* Lobsters liberated from pounds would be paid for over and over again, unless some costly and complex method of supervision were adopted.

6. *Hatchery officers are untrained.*—Such officers should have a course of technical training, as the successful operating of a hatchery requires expert knowledge. Without such expert knowledge failures, such as have happened in so many hatcheries, must continue. The Biological Board might be asked to provide a course of instruction.

7. *Standard lobster trap with wide slats.*—We recommend the rescinding of subsection 17 of the Lobster Regulations, Order in Council, September 30, 1910, viz.:—

> 17. All lobster traps constructed after the 31st day of December, 1910, shall have the laths on all portions thereof, not less than 1¼ inches apart, and this space must remain clear and nothing shall be done to diminish it, and any netting that may be used in such traps, shall have meshes of not less than 3 inches extension measurement, and nothing shall be done to practically diminish the size of the mesh; and all lobster traps used after the 31st December, 1910, but which were constructed before that date, and which do not comply with the above requirements, shall be so remodelled, that each of the three lower spaces between the laths next to the bottom of the trap, on either side, shall be not less than 1¼ inches wide.

8. *Lobster stamps.*—We are convinced that the stamps as at present used are worthless and encourage illegal packing. Either the official stamps should be affixed by fishery officers only or the stamps should be abolished, and a burnt brand method be adopted.

9. *Reduction of lobster canneries.*—The number of canneries in some localities is so excessive that the fishery is pursued to excess far beyond wise and safe limits. It is being overdone generally. Hence the department at Ottawa should be called upon to exercise control and discretion, and new canneries should be discouraged until the industry showed evidence of recuperation.

10. *Buildings, not proper canneries, licensed.*—Shanties and buildings which are not regular legitimate canneries should not be licensed. Many shanties have been officially authorized which are merely used as bases of operations, enabling canners to encroach upon areas already occupied by established canners.

11. *Medium live lobster export.*—For reasons set forth in this report, the export of small and medium lobsters should be discouraged in the interest of the Canadian industry, and to stop the demoralization of the live lobster trade in the United States, the effects of which must recoil upon our fishermen.

12. *Lobster fishing permit.*—We strongly recommend a permit, issued free, and requiring the holder to replace in the sea 'berried' or 'seed' lobsters and observe other conditions in the interests of the fishery. Such permit will enable a record to be kept of the names of all fishermen engaged in lobstering, and place all under the same rules and conditions, such as free fishing cannot provide.

13. *Supplying illegal gear.*—Packers who supply lobster gear, boats, &c., to facilitate fishing, after the season ends, should be dealt with as violators of the law, and provisions should be enacted accordingly.

14. *Oyster licenses.*—We emphasise the desirability of limiting the number of licenses on public beds, which are to pass to the several provinces. Local residents should have preference, and areas restored and improved by the Dominion, or other governments, should be reserved in such a way as to benefit the public beds adjacent. Improved areas in the past have been rapidly destroyed by being thrown open to unrestricted fishing.

15. *Destroying oyster enemies.*—As is well known, starfish, sunstars, &c., on oyster beds are very destructive and can be readily cleaned off by means of baited mops or 'tangles' of unravelled rope. The crews of the fishery cutters could do valuable work on the public beds if employed for a time in this work.

16. *Technical instruction for fishermen.*—Provision should be made for giving instruction to fishermen on the products of the seas and the most recent investigations on the fisheries. It would intensify their interest in their calling and would increase their appreciation of the importance of fishery regulations, the objects aimed at, &c. The biological board could no doubt arrange for such instruction.

The example of the Department of Agriculture might well be followed in this respect.

17. *Fishery studentships.*—A large number of able young men at the various universities would be able to take part in fishery research were government studentships or scholarships provide. At present the means are wanting, and the biological stations rely upon the able workers only, who are willing to sacrifice time and money in the pursuit of original investigations into fish-life in the sea. The most difficult problems relating to fisheries would be solved were a body of young men enabled by studentships to devote some of their post-graduate years to such work.

18. *New shell-fish fisheries.*—New mussel and periwinkle fisheries could be created without difficulty, and we make suggestions *re* the unutilized shell-fish which are abundant and widespread.

19. *Reorganization of inside and outside fishery service.*—The existing system is most defective and is a cause of much dissatisfaction. It requires thorough reorganization. Qualified officers, at more adequate salaries, are needed. Fishery agents are needed in the maritime provinces. The inside service has for some years been out of touch with the fishing population, who seem to have little confidence in the methods and practical knowledge of the staff. Changes are urgently called for, if the fishing population are to have confidence restored, and the sympathy gained, without which the enforcement of any system of protection and preservation is practically impossible.

RECOMMENDATIONS OF THE COMMISSION.

I.

LOBSTER FISHERY DISTRICTS WITH THEIR RESPECTIVE CLOSE SEASONS AND SIZE LIMITS.

District No. 1—In the waters of the Atlantic Coast of Canada from the International Boundary between Maine, U.S.A., and New Brunswick and along the coast line of Passamaquody Bay and the Bay of Fundy to Rodger's Point on the north side of Digby Gut, lobster fishing to be permitted from October 1 in each year to May 31 following, and no lobster or lobsters the carapace of which measures less than 4¾ inches in length to be permitted to be taken.

District No. 2.—From Rodger's Point on the north side of Digby Gut along the coast line of Canada including Annapolis Basin, to a line running south southeast from St. George's Island, Halifax Harbour and coinciding with the fair-way buoys in the entrance of said harbour, lobster fishing to be permitted from December 1 in every year to May 15 following, and within these specified limits no lobster or lobsters less than 8 inches in length during the season 1913-14, or less than 8½ inches in length during the season 1915-16 or less than 9 inches in 1917-18, to be permitted to be taken.

District No. 3.—Along the Atlantic coast of Canada from a line running south south-east from St. George's island, Halifax harbour, and coinciding with the fair-way buoys in the entrance of said harbour, northeast to Red Point between Martin Point and Point Michaux in the Isle of Cape Breton and in the waters of all the islands adjacent to Chedabucto and St. Peter's bay, and including the coast and waters of the Gut of Canso as far as a line passing from Flat Point in Inverness county to the lighthouse in Antigonish county opposite, lobster fishing to be permitted from April 1 to June 30 in each year, nor shall any one within the above described limits take any lobster or lobsters less than 7 inches in length during the season 1914-15, of 7½ inches during the season 1916-17, or less than 8 inches in the season 1918.

District No. 4.—In the remaining waters surrounding the Island of Cape Breton from April 15 to July 15 in each year lobster fishing to be permitted, nor shall any one within the above described limits take any lobster or lobsters less than 7 inches in length during the season 1914-15, or 7½ inches during the season 1916-17, or less than 8 inches during the season of 1918.

District No. 5.—In the waters along the coast line extending from the entrance of the Straits of Canso, defined by a line passing from Flat Point in Inverness county to the lighthouse in Antigonish county opposite, to the northern boundary line of New Brunswick and including Miscou island, N.B., and the waters of Prince Edward Island lobster fishing to be permitted from April 20 to July 1 in each year. No one shall be permitted to take within the above described limits any lobster or lobsters less than 7 inches in length in the years 1914-15, or less than 7½ inches in the season of the years 1916-17, or less than 8 inches in length in the year 1918.

II.

Time for setting lobster lines, lobster gear.—No one shall be permitted to fish for lobsters by preparing or setting out any buoys or lines or other gear in connection with lobster fishing before eight o'clock in the morning of the day on which it is lawful to take lobsters in the different districts.

III.

Regulation respecting exportation of live lobsters.—No one to be permitted to engage in exporting or have in possession for the purpose of exportation in or from any part of Canada any live lobster or lobsters the carapace of which measures less than 4¾ inches in length.

IV.

Regulation re *standard lobster trap to be rescinded.*—In view of evidence as to the effect of the wider space between the laths of lobster traps, provided in subsection 17 of section 5, Order in Council, September 30, 1910, it should be rescinded.

V.

Dominion Lobster Fishing Permit.—We recommend the isue of a lobster permit or license without which no person should be permitted to engage in lobster fishing and suggest the following form:—

GOVERNMENT OF THE DOMINION OF CANADA.

LOBSTER FISHERMAN'S PERMIT.

(Issued without fee.)

For the season of.....

This Permit is granted to.....of.....
to fish for, catch or take, lobsters in the territorial waters of Fishery District No...
..... between ....
..... and .....
under the provisions of the Fisheries Act and regulations under it, which regulations are printed on the back of this permit.

.....

Dominion Inspector of Fisheries for District.....

Countersigned by the local fishery officer.....19

VI.

Recommendation re *new hatcheries and lobster pounds.*—We strongly recommend that no new hatcheries or lobster pounds be established until the success and benefit to the industry of those already established has been satisfactorily demonstrated. We have elsewhere made a recommendation *re* the training and proper qualifications of lobster hatchery officers.

In this connection we think it would be valuable to make a test of lobster planting by setting apart the waters of Bedford Basin, N.S., as a lobster rearing area, placing therein each season for five years 10 to 20 millions of fry.

No commercial lobster fishing is being prosecuted in this basin and at one time it was a valuable lobster ground so that such a test would be of importance.

The efficacy of hatching, planting and developing lobster fry could be demonstrated in such an area.

VII.

Supervision of lobster exportation.—The evidence given especially in western Nova Scotia shows that the shipments of live lobsters sent from Canada to the United States could hardly be handled in a worse manner. Every arrangement seems to be made by the shipping companies to insure that the shipments should arrive in bad condition and no care seems to be taken of those valuable shell-fish.

When shipped in crates or boxes to Boston or other ports the lobsters in order to arrive in the best condition should not be roughly handled. They should be kept the same side up so that the lobsters do not lie for any length of time upon their backs and they should be kept cool; nor should they be too long in transit.

Under the present condition the lobster crates are treated with the utmost violence and roughness so that the boxes are actually smashed and they are kept for hours on end or turned upside down without regard to the live shell-fish inside and it is well known the lobster is very injuriously affected if placed head downwards for any length of time, while it frequently occurs that the crates are piled up beside the steam pipes and subjected to great heat, a condition which is absolutely fatal to the living crustaceans in such crates.

The steamship companies make no provision for keeping the lobsters cool, and whereas shipments of fruit such as apples worth from $3 to $4 a barrel are handled with the utmost care and keep in cool suitable apartments, the lobsters which are

from five to ten times more valuable receive no consideration whatever and the rates for carriage of lobsters is about double that of apple shipments.

It should be added that the fishermen themselves often keep the lobsters far too long before placing them in the hands of the rail or steamship companies.

VIII.

OYSTERS.

Standard oyster barrel and box.—All oysters packed in Canada for sale shall be packed as follows:—

(1) When in barrels they shall be packed in barrels 27 inches from croe to croe, 16½ inches to 17 inches diameter of the heads, with a middle diameter or bilge of not less than 18½ inches. If in half-barrels the measurements shall be 22 inches from croe to croe and 13½ to 14 inches diameter of the heads, the staves in both cases to be not less than three-eighths inches in thickness if hardwood or ½-inch if of softwood, same to be well and strongly made.

(2) When packed in Canada for sale in boxes the boxes shall be of such capacity as to contain not less than one bushel or 2,200 cubic inches or in half boxes of not less capacity than ½ bushel or 1,100 cubic inches.

IX.

Branding of oyster barrels and boxes.—All barrels or boxes containing oysters in the shell, before leaving the first point of shipment, shall be stamped or branded with letters not less than ½-inch in length and in a plain indelible manner as follows:—

(A) With the full name and address of the individual, firm or corporation shipping the same, and shall also bear (B) the name of the exact locality where the contained oysters were grown, fished or taken and if the contained oysters be non-native or foreign oysters, the barrels or boxes shall be further stamped or branded with the designation 'Replants' or 'Re-planted Oysters.'

Transplanted oysters after being laid down on any oyster bed in Canada to be classed as 'Native.'

X.

Size limit for quahogs.—Hard-shell clams or quahogs of a less size than 1¾ inches in length are prohibited and any hard-shell clams or quahogs measuring less than 1¾ inches in length on the outer shell that may be accidentally caught, to be returned to the water alive by the person so fishing, provided that for the reason of re-planting for development of quahog culture on leased areas, hard-shell clams or quahogs of a less size than that specified may be legally caught and possessed.

XI.

Close season for quahogs.—Fishing for hard-shell clams or quahogs to be prohibited excepting during the period each year extending from May 10 to July 1, and from September 1 to October 31, in every year.

XII.

Maximum size limit for quahogs.—No hard-shell clams or quahogs 3¾ inches in length and over to be taken and any such hard-shell clams or quahogs of that dimension (commonly called 'Bulls' or 'Bull Quahogs') to be returned to the water alive by the person fishing for or taking them.

XIII.

Close season for soft-shell clams or sand clams.—Soft-shell clam fishing to be prohibited from June 1 to July 31, in each year, provided that such soft-shell clams may be fished for or taken and possessed for fresh bait purposes at any time by any British subject resident in Canada and carrying on fishing operations in Canada, and for domestic use by British subjects residents in Canada.

XIV.

'SCALLOPS.'

We recommend that a minimum size limit for the Canadian pecten or scallop should be 4 inches in diameter that is, measured across the shell from side to side.

Close season.—The close season should be July 1 to September 1. There are three species of the scallop or pecten on the Atlantic coast, namely, the smooth scallop which is the most common species in Canadian waters and is of large size when adult and less deeply ribbed than the other species which occur sparsely, especially toward the shores of the United States.

This Canadian scallop may measure as much as 5 to 6 inches or even 8 inches in diameter, and is of a whitish or cream colour though the upper shell may have a reddish tint.

The Iceland scallop also occurs but is less plentiful and is rarely more than 3 or 4 inches in diameter, and the ears are unequal in size while the ribs are very close and numerous, from 50 to 100 in number on the upper valve. It is somewhat brilliantly coloured, being of a reddish, brown or purple tint.

The rarest species in Canada is the deep ribbed or American scallop, called 'Irradians' on account of the deep marked rays or ribs, about twenty in number. It is not so brilliantly tinted as the Iceland scallop but is of a pale white colour like the smooth scallop. It is distinguished also by the ears or lateral projections which are nearly of equal size. This scallop is the most important commercially along the United States shore, being plentiful from Massachusetts as far south as the Gulf of Mexico.

XV.

Leasing of oyster and clam beds.—The commission cannot too strongly urge that all unproductive areas or all so-called barren beds in which oysters or clams may be cultivated should be leased to suitable parties and on suitable terms as to re-stocking and systematic cultivation only by leasing such areas, many of which were once productive can the oyster and clam resources of the maritime provinces be made remunerative.

It is undeniable that no parties will expend time or money in improving oyster or clam beds unless they can secure leases for definite areas and thus receive the full benefit of their expenditure of time and money.

In leasing these areas it is absolutely essential that the lessees should undertake to carry on the systematic cultivation of shell-fish as exemplified in the cultivated beds in the United States and France and other countries.

CONCLUSION.

In presenting our report and recommendations, we cannot refrain from repeating our conviction that no fishery resources on the Atlantic coast are more important than the lobster, oyster and shell-fish resources. The time has come in our opinion for protecting these in the most efficient and satisfactory manner possible. Regulations have been devised and a policy has been pursued in past times which

appear to be inadequate for these fisheries to the Dominion as a whole. Neither the regulations themselves nor their enforcement has been in any way adequate. The feeling has been too prevalent along the Atlantic shores that these fisheries are of concern only to the local residents actually engaged in them, and methods of protection which were likely to be effective were regarded as too drastic, and aroused general opposition. Further, fishery officers who were too active or zealous in enforcing the regulations incurred the dislike of the local communities rather than gained their encouragement and support. We would emphasize the fact that the lobster, oyster and clam fisheries are national industries, and that the supply of these valuable shell-fish is a matter of concern to the whole country, from the position of the Dominion as a whole and not of a province or a limited section of the Maritime population. It is because we feel that these fisheries are a national resource that we have ventured to make the recommendations embodied in the forgoing report, and to emphasize the necessity of a reorganization of the protective force of officers, and a more vigorous and adequate system of protection and preservation for the benefit of Canada as a whole.

We would also add our conviction that these resources are worthy not only of conservation and preservation, but are capable of enormous development. While we feel that such a department as the Department of Agriculture is making large grants for the encouragement of agriculture and the utilization of the vast resources of the land, the Department of Marine and Fisheries would be well justified in giving generous consideration to the large population engaged in the hazardous pursuit of fishing and in harvesting the immense fishery products of our Atlantic waters. The fishery industries are worthy of all possible encouragement by the government.

Our recommendations regarding the reorganization of the fishery service, the extension of the work of the Biological Board, especially by means of studentships for fishery researches, as well as the changes we suggest with regard to the handling of fishery products and their shipment in the best condition to the markets, and the safe-guarding of the interests of the fishermen, packers and all interested in the industry, are urged in our report with a view to this desirable end, namely, the preservation and development of the shell-fish industries of the Atlantic coast of Canada.

Respectfully submitted,

(Signed) JOHN McLEAN,
RICHARD O'LEARY,
S. Y. WILSON. } *Commissioners.*

EDWARD E. PRINCE,
Commissioner of Fisheries, Chairman of the Commission.

INDEX.

The Quahaug (Venus mercenaria) and the Clam (Mya arenaria)
(short siphon) (long siphon)

The quahaug is quite frequently called the hard-shell clam in distinction to the soft-shell clam. Unlike the latter it does not burrow deeply into the mud, but simply uses its foot to cover itself, and its siphon (a double chambered organ with an incurrent and excurrent tube) is therefore suitably short, so as to protrude immediately above the water.

The shell of the quahaug is rounded and thick, and is often internally pleasingly purplish in colour.

Unlike the oyster it does not thrive in brackish water, but its haunts are in sheltered bays for it avoids the exposure of the open sea. It has an ideal habitat in the Northumberland Strait, being very plentiful in Buctouche Bay, Cocagne Bay, and Shediac Bay, New Brunswick; and it is also plentiful in sheltered places in the strait in Nova Scotia and Prince Edward Island.

The quahaug is obtained with rakes, and makes an excellent chowder.

The clam, often distinguished from the quahaug as the soft-shell clam, is constructed for burrowing quite deeply into the mud. The body and siphon are long, and the shell is long and thin.

Practically everywhere in the northern parts of the shores of the Atlantic coast of Canada, wherever there is mud of a suitable depth, the clam is to be found. It is obtained by digging in the mud during the recession of the tide, and it is a common sight to see men, women, and children, with their spades and pails engaged in getting it. When disturbed it seems to retreat down into its burrow.

A dish of clam chowder is an excellent culinary dainty.

MARITIME PROVINCES

Showing the different sections to which the size limits and various close seasons apply as recommended by

THE SHELL FISH COMMISSION

1912-13

District No. 1.	Open season	OCT. 1—MAY 31.	Size limit 4¼″ carapace	8″ in 1913-14 8¼″ " 1915-16 9″ " 1917-18
" 2.	"	DEC. 1 " 15.	"	8″ in 1913-14 8¼″ " 1915-16 9″ " 1917-18
" 3.	"	APL. 1—JUN. 30.	"	7″ " 1914-15 7½″ " 1916-17 8″ " 1918
" 4.	"	" 15—JUL. 15.	"	7″ " 1914-15 7½″ " 1916-17 8″ " 1918
" 5.	"	" 20— " 1.	"	7″ " 1914-15 7½″ " 1916-17 8″ " 1918

Longitude West from Greenwich